



From Department of Agriculture,
Brisbane.



THE

QUEENSLAND



ILLUSTRATED GUIDE;

FOR THE USE OF

FARMERS, FRUIT-GROWERS, VIGNERONS, AND
OTHERS.

WITH A MAP.

BRISBANE:

JAMES C. BEAL, GOVERNMENT PRINTER, WILLIAM STREET.

1888.

PREFACE.

THIS Queensland Guide, being a description of the colony brought down to the present period, has been written at my request by Mr. Alfred Midgley, who has been many years resident in Queensland, and whom I believed to be possessed of special qualifications for the work. The result has not disappointed me, and will, I am assured, be satisfactory to all readers who know the colony, and who desire to see it progressing by means of a large influx of people from Europe and America, and especially from Great Britain.

Persons of the right class possessed of some little capital and of some farming experience, especially such as can do most of their own labour with their own hands or with the help of members of their own families, and who may be disposed to settle in Queensland, will find in this book much reliable and invaluable information, such as will prove a safe guide to them in settlement upon the land which is now open in considerable quantities, both in grazing farms and agricultural farms, in many parts of the colony.

It was intended to include in this publication a guide to selectors, showing full particulars of all the land open for occupation in each of the Land Agents' Districts of the colony up to the date of publication, together with important particulars as to descriptions of soil, climate, rainfall, natural products, geography, principal towns, progress of settlement, and lands open for selection in the several districts, but it has been found impossible to collect and prepare all the requisite material for this purpose in time for this first issue. It is now intended to furnish the information at the earliest possible period in a second edition of the book, and afterwards in a pamphlet published quarterly, to be entitled "The Selector's Guide," and in the meantime, the first issue of this volume now presented to the public contains what is specially interesting to that numerous class of persons in Great Britain who are disposed to try their fortunes where they will have more room

and greater opportunities of success than in the loved but little pent-up country in which they were born. Such persons are always eagerly on the look-out for reliable information concerning new countries where special facilities exist for successful settlement on the land, and what is herein contained will no doubt commend itself to very many of this class, who, while determined to seek a wider field for their enterprise, have yet no desire to live under any other than British rule.

The natural increase of the population of Great Britain—births over deaths—being nearly a thousand a day, a large proportion of this increase finds its way spontaneously, by means of an unassisted emigration of the very best class, either to the British Colonies or the United States of America. It is believed that fuller information about the British Colonies of Australia would result in attracting a much larger proportion of these invaluable people to these shores, and it is hoped that the extensive and gratuitous circulation of this little book in Great Britain will have that much to be desired effect.

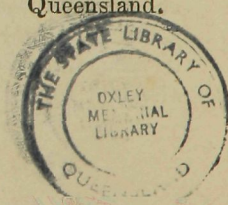
The popular series of pamphlets entitled “Papers for the People,” now reprinted as a part of this issue, have been prepared gratuitously at my request by practical men, who have most of them acquired their skill on the land in the colony, and I here tender my thanks to the writers for their very valuable contributions. These papers have been received in Queensland with much favour, and have also been commended in other parts of Australia; and it is believed they will prove interesting and valuable to all persons in the old country who may come here and settle on the land, availing themselves of our land-order system of immigration, by which persons who pay their own passages in-full direct to Queensland and settle on grazing or agricultural farms, receive what is equivalent to a free gift of twenty pounds’ worth of land for each adult member of their families.

HENRY JORDAN,

Minister for Lands,

Queensland.

Department of Public Lands,
May 22nd, 1888.



ILLUSTRATIONS.

PARLIAMENT HOUSE, BRISBANE.

IMMIGRATION DEPÔT, BRISBANE.

A QUEENSLAND FARM AND FARM HOUSE.

SUGAR PLANTATION AND WORKMEN'S HOUSES.

A COUNTRY SAWMILL AND WORKMEN.

VIEW ON THE SOUTHERN AND WESTERN RAILWAY.

VIEW OF BRISBANE AND BRISBANE RIVER.

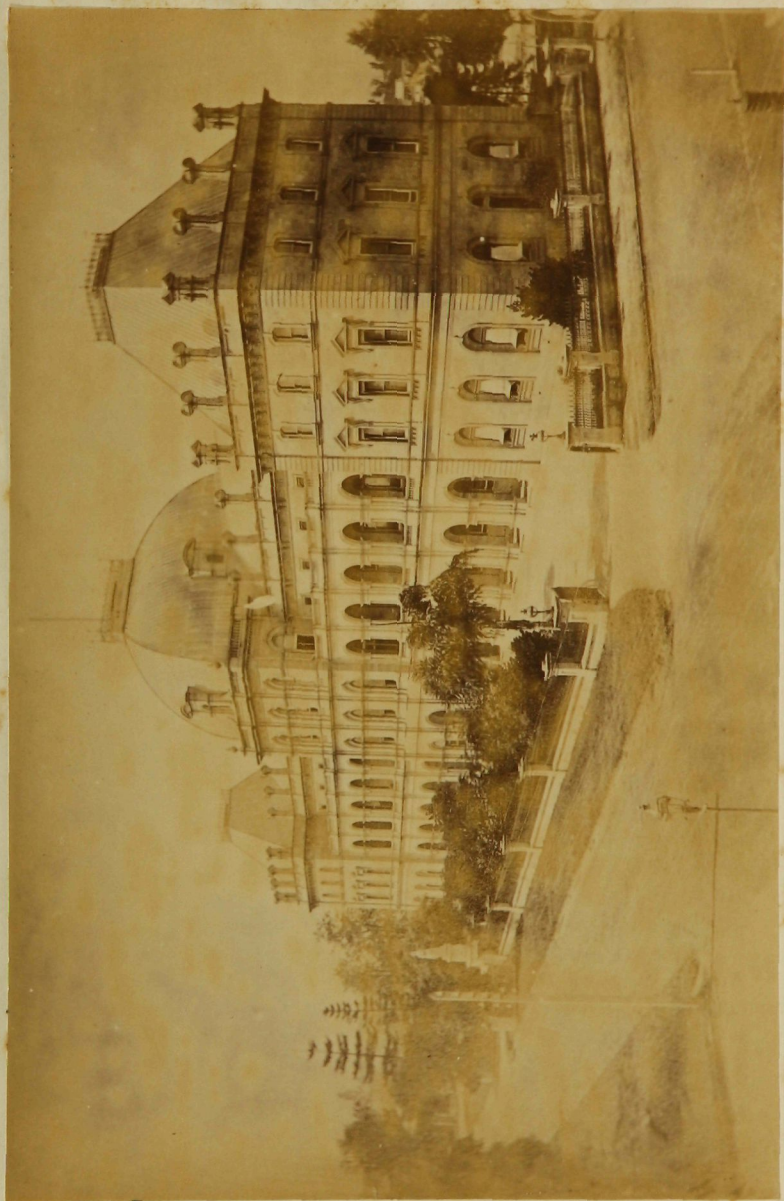
SCRUB SCENERY ON A QUEENSLAND CREEK.

GRAMMAR SCHOOL, MARYBOROUGH.

(The above are from Photographs by Paul C. Poulson.)

NOTE.—This edition is published especially for circulation in Great Britain. A more complete edition can be obtained shortly in Queensland, showing all lands open to selection in the different Districts of the colony, together with particulars of soil, climate, rainfall, natural products, geography, principal towns, progress of settlement, &c., &c.





PARLIAMENT HOUSE.

THE QUEENSLAND ILLUSTRATED GUIDE.

CHAPTER I.

EXTENT, AREA, AND POPULATION.

YOUNGEST COLONY OF THE GROUP.—Queensland is the youngest colony of the Australasian group; in an important sense it is the largest, as the Northern Territory of South Australia has no such vital connection with that colony as exists between the southern, northern, and interior parts of Queensland. Over the whole of Queensland there are the same laws and administration, and local government bodies exist. The whole colony is divided into electoral districts; the Supreme Court holds sittings in northern towns, and one of its judges resides permanently in the North.

BOUNDARIES.—SEABOARD.—The Pacific Ocean on the east, and the Indian Ocean on the north, form the natural boundaries on those two sides. The seaboard commences at Point Danger in the south, and extends northwards to the extremity of the Cape York Peninsula, and thence westward to the 138th degree of east longitude. The boundary on the west is a line running from the 138th degree of east longitude to the 26th degree of south latitude; thence three degrees east, and thence again, at right angles, three degrees south to the 141st degree of east longitude. The southern boundary is almost a straight line between New South Wales and Queensland at the 29th degree of south latitude back to Point Danger. By means of its very long seaboard, with the many sheltered bays and navigable rivers, the various parts of the colony have been opened for settlement much sooner than could have been accomplished if the greater part of the interior had had to be reached by overland routes alone.

NAVIGABLE RIVERS.—Rivers that in the early days of exploration were a mystery in their origin are now the highways of an ever-increasing commerce—the main

arteries of the life of many a flourishing town. The chief of these navigable streams are distributed with remarkable regularity of distance along the entire eastern coast, and smaller but immensely useful rivers have facilitated trade and the opening of the country in the distances between. Brisbane, Maryborough, Rockhampton, Mackay, Townsville, Cairns, and Cooktown are the principal ports, and a glance at the map will show the remarkable equi-distance of these ports from each other.

THE GREAT DIVIDING RANGE.—The Great Dividing Range runs about midway across the colony from east to west to within about 250 miles of the coast; thence it runs almost parallel with the coast line, but the same distance from it some hundreds of miles south, then turning abruptly to the east to within 100 miles of the sea, and continuing thence into New South Wales and Victoria. It is this range of hills that so largely causes the difference of climate, vegetation, and agriculture in different places situated in the same latitudes but at different altitudes.

NATURAL DIVISIONS. — VEGETATION. — ADAPTATION OF DIFFERENT PLACES TO DIFFERENT CROPS.—The coastal districts, the Downs country, and the western interior are the three great natural divisions of the country. Plants, fruits, flowers, and stock that would grow and flourish in one part would be of doubtful or feeble growth in another. Wheat is not thoroughly at home on the coast, and sugar is not at home on the Downs. The intending settler would need to know something about the special fitness of the soil and climate before planting this or that, but it is information easily obtained and best obtained after arrival in the colony. The immigrant soon learns then that the names of many places are almost synonyms for the particular products, agricultural, pastoral, or mineral, as the case may be, for which they are specially suitable or particularly noted.

SEPARATION FROM NEW SOUTH WALES.—Until December 10th, 1859, the whole of the territory now known as Queensland formed part of the colony of New South Wales, and it was at that time simply known and spoken of as the Northern Districts.

The granting of separation from the parent colony by the Home Government was the dawn of a new era. From the obscurity and neglect of a mere appendage the country started, with a name at once descriptive and prophetic, on the career of an independent colony. So far as this work deals with its growth and history it deals only with the period that has elapsed since then.

The 10th of December has, ever since 1859, been observed as a national holiday, and of the numerous holidays in which Queenslanders indulge none is more appropriate or popular than this.

POLITICAL CHANGES.—The political changes in Australia, many of them involving large areas of magnificent territory, have been accomplished by lawful and peaceful means. There may have been strong feeling and spirited debate, but all matters of colonial and intercolonial difficulty have, in the end, been amicably and satisfactorily adjusted.

Separation was not granted to Queensland without considerable contention and delay, but the bloodless battle was won ultimately, and Queensland has proved the wisdom of those who struggled for it—worthy of the confidence placed in her, and fully capable of the work of self-government.

COMPARATIVE STATISTICS.—To assist the British reader we shall indulge considerably in comparisons when dwelling upon the dimensions, population, cultivation, and commerce of the colony. These, and the necessary statistics, will be made as brief and clear as possible; and to anyone perplexed with the problems of social life in the "Old Country," or contemplating a radical change in his own lot in life, these comparisons should be deeply interesting.

What are the inducements to emigrate to Queensland so far as *room* is concerned? Is it, after nearly thirty years of self-government, and more or less of free or assisted immigration during that period, becoming now too strait for the people that are already in it? Can a man get there easily, cheaply, and expeditiously, and when he gets there has he a good chance of obtaining employment, and a prospect of obtaining, in a reasonable time, a home of his own, and a heritage for his children?

ABUNDANCE OF ROOM.—The inquirer will be able to form his own conclusion, and shape his own reply to many such questions as these, on carefully reading the following chapters. On this point he will have no uncertainty, the abundance of room that there is for him and his enterprise and energy, when he learns how large the colony is, and how few are the people inhabiting this grand territory.

COMPARATIVE SIZE AND EXTENT.—With regard to size and extent Queensland stands almost peerless amongst the colonial possessions of Great Britain. It is seven and a-half times the size of Victoria; over two and a-half times the size of New South Wales; over six and a-half times the size of New Zealand; twenty-five times the size of Tasmania; and about twice the size of Canada. It is nearly eleven and a-half times the size of England and Wales; fully twenty-two times the size of Scotland; and about the same number of times the size of Ireland.

COMPARED WITH ENGLISH COUNTIES.—Its great extent may be more fully realised by many for whose information this work is specially intended if we compare it with a few English counties, one or another of which will be known to most readers. Adopting this mode of comparison, we find that Queensland is, in round numbers—

332 times the size of the county of Northumberland				
110	”	”	”	Yorkshire
354	”	”	”	Lancashire
2,359	”	”	”	Middlesex
896	”	”	”	Buckinghamshire
258	”	”	”	Devonshire
495	”	”	”	Cornwall

Such, relatively, is the size of Queensland—its actual extent being, roughly, 1,500 miles in length, and 1,000 miles in breadth. The latest estimate of its area is 668,497 square miles, or 427,838,080 acres. England and Wales contain only 37,000,000 acres, Scotland about 19,000,000, and Ireland about 20,000,000 acres.

So far, then, as mere *terra firma* is concerned, and ample space to move and breathe, Queensland affords abundant room for many millions of the human race.

AREA AND POPULATION.—Another striking phase of this interesting subject is brought prominently into notice, when the extent of the country in comparison with other lands is considered in relation to their respective populations. Let the reader weigh carefully the following facts, which point to the conclusion that the evil of over population in the old lands has its remedy provided by Nature, and needs no such inhuman and revolting remedy as has been sometimes advocated. The remedy is simple and natural.

CENSUS RETURNS OF UNITED KINGDOM AND QUEENSLAND.—The last census of Queensland was taken on May 1st, 1886; the last census of the United Kingdom was taken in 1881. The population of England and Wales was 25,974,439, and of the whole of the United Kingdom 35,241,482. The population of Queensland was only 322,853. From this data may be drawn the following facts, comparisons and inferences:—

- (1.) The increase in the population of England and Wales in the last census period was equal to ten times the total population of Queensland in 1886.
- (2.) This increase took place in ten years from 1871 to 1880, and amounted to 3,262,173, or nearly equal to the total population of all the Australasian colonies put together at the end of 1885.
- (3.) Should Queensland ever be as densely populated as England and Wales it will then have a population of 300,000,000; that is, its present population will need to be multiplied 930 times.
- (4.) The whole of the Australasian colonies cover about 1-17th part of the earth's surface, but do not contain 1-440th part of the earth's population.
- (5.) *Population to the Square Mile.*—Queensland with the exception of South Australia and Western Australia, is the least densely populated of all the colonies of the Australasian

group. In 1881 a careful estimate of population to each square mile was made, with the following result, omitting small decimals:—

Victoria	had	$10\frac{1}{3}$	inhabitants	to the sq. mile
New South Wales	$2\frac{1}{2}$	„	„	„
Tasmania	$4\frac{1}{2}$	„	„	„
New Zealand	$4\frac{4}{5}$	„	„	„
Queensland	$\frac{1}{3}$	(fully)	„	„
South Australia	$\frac{1}{3}$	(hardly)	„	„
Western Australia	$\frac{1}{3\frac{1}{2}}$	„	„	„

- (6.) Although the population of Queensland has increased considerably since the preceding estimate was made, yet at the census of 1886 it was found that there was still only 0·478—that is, there was not quite one inhabitant to every two square miles.
- (7.) It is worthy of note that even in the southern division of the colony, which was the first settled, and is the most thickly populated part of it, including as it does the capital and a number of the largest towns, there were only $1\frac{1}{6}$ inhabitants to each square mile. In 1881 there were 446 inhabitants to each square mile in England; while in Belgium, in 1880, there were 485; and in Saxony, 514 to each square mile.
- (8.) In the fifty years preceding the census of 1881, the population of England and Wales increased 86·9 per cent. The increase between 1871 and 1881 was 929 for every day during the decade. The daily increase during the preceding ten years was 692. It is calculated that if the same rate of increase is maintained, the population will be double in 1936 what was in 1881.
- (9.) The aggregate population of the whole of the British Empire was estimated at 254,000,000, occupying 8,000,000 square miles. Australasia comprises three-eighths of the territory, but contains only about one-seventy-fifth of the whole population.

The significance of these comparisons is apparent. It is hardly credible that in all the territory of Queensland, a colony which has had an independent existence for nearly thirty years, there were still only 322,853 inhabitants—not as many, in fact, as there are in the one municipal borough of Manchester alone.

NUMBER OF WOMEN AND CHILDREN.—If from the total population the women and young children be deducted, and also the number of men living in the towns, engaged in commercial or professional pursuits, it will then be seen, even more vividly, how few as yet are engaged in developing the pastoral, agricultural, and mineral wealth of the colony. Nearly 74,000 of the inhabitants were, at the census, within a radius of five miles of the Brisbane Post Office. The total number of females in the colony was 132,509; the total number of male children under fifteen years of age was 34,840.

ACQUISITION OF AUSTRALIA.—In these facts there is abundant cause for reflection. It is generally considered that Great Britain has shown remarkable aptitude for the work of colonisation, and, compared with other nations, so much may be readily conceded. So far as Queensland is concerned it will be safe to say that her progress has been the result of her inherent wealth and vitality, and has not been dependent upon maternal oversight or assistance. England in some instances has been prompt to acquire but slow to turn to their best use some of the fairest and richest regions on earth; slow to understand and utilize the opportunities and deliverances which modern discoveries of Nature's abundant provision have made possible and easy.

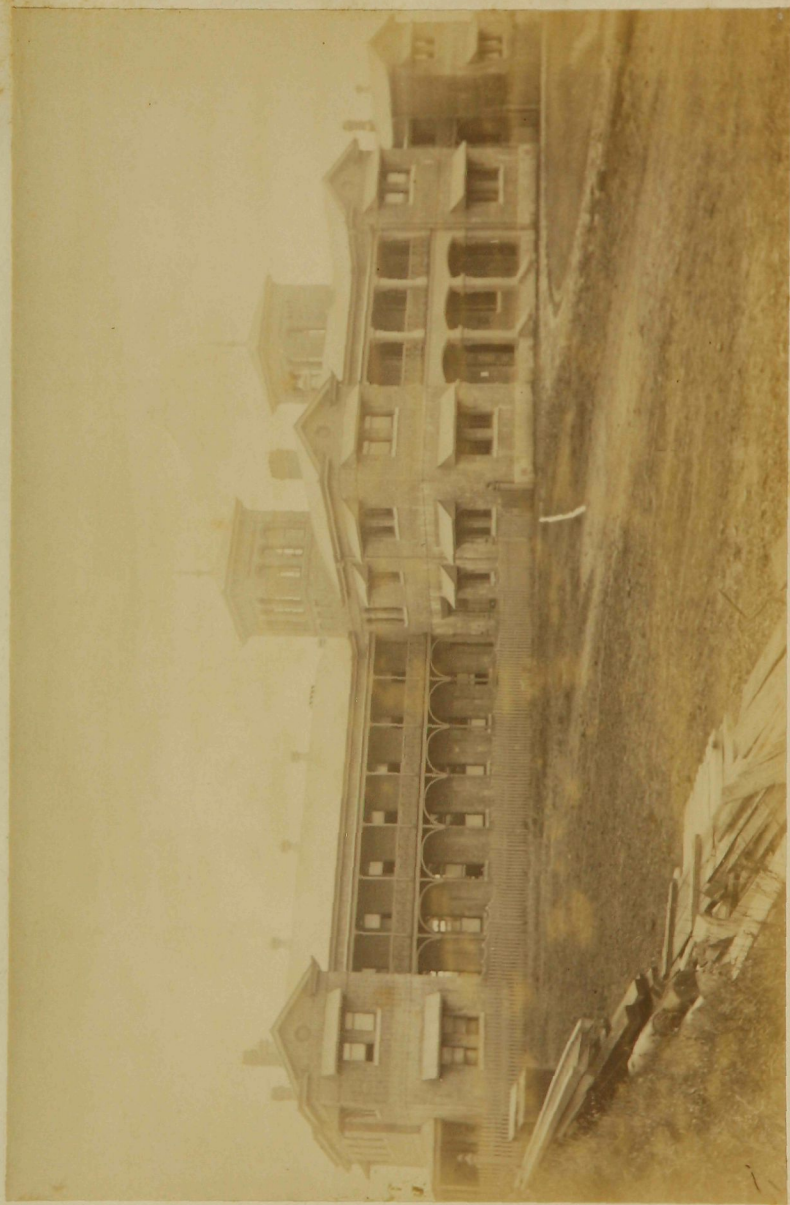
EMIGRATION FROM ENGLAND.—With her immense national wealth and grand possessions, England holds the solution of problems of social life, which can never be satisfactorily solved so long as she confines her attention to the limited territory comprising the United Kingdom.

Australia, acquired by England without bloodshed, and retained and governed hitherto without perceptible cost to her, is only now beginning to be understood and recognised in a manner worthy of the natural resources and the growing importance of the great Southern Continent.

For untold ages its wealth and beauty were unknown to the white man; its resources were reserved and kept in store until mankind should need them. Then came discovery and exploration by men whose names will be immortalised in Australia's classic lore, and the whole continent, one great treasure trove, was acquired by England without a struggle.

UNDESIRABLE IMMIGRANTS.—And while in themselves the increase of population, the expansion of commerce, and the evidences of enterprise and industry may be gratifying, and in some respects wonderful, there is room for the contention that, in view of the crushing necessities of tens of thousands of British subjects on the one hand, and the enormous wealth and boundless territories of Britain on the other hand, she has not always made the most and the best of the means at her disposal. A country which still retains the tenure and monopoly of land of feudal times, under the completely altered conditions of its social and national life in the present day, should not discountenance but encourage the emigration of its surplus population to its colonial possessions. Nor should it seek only to rid itself of its criminals and its paupers, for both classes of which its own political institutions with regard to the land are largely to blame. The desire to ship to the Australian colonies only the poor and the aged and the halt and blind is little less offensive to colonists than was the attempt to keep this fair land as a place of banishment for felons.

Both ideas are ignoble and indicate culpable ignorance of or disregard for the hopes and aspirations of Australians with regard to the future position and power of these young nations amongst the nations of the earth. Queensland wants men of character and of energy in its young years to develop its resources, and in the exercise of their political power to direct its course and shape its destiny with such conscientious care that ere long it shall take its place amongst the nations of the earth rich in all the qualities that make a people truly great and prosperous and free.



IMMIGRATION DEPÔT.

CHAPTER II.

EMIGRATION TO QUEENSLAND.

IMMIGRATION.—In each of the Australian Colonies there is, or has been, some system of immigration, under Government control and paid for out of each colonial exchequer. It is equally true that in each of them a conservative and jealous element soon made itself heard, and in some instances felt. Free and assisted immigration has not been considered as a matter of philanthropy but a matter of policy, and a policy liable to be modified or changed or abandoned at any time.

NO FREE EMIGRATION TO VICTORIA—FREE EMIGRATION TO QUEENSLAND.—Although there were only $10\frac{1}{3}$ inhabitants to each square mile in Victoria in 1881, yet Victoria since 1882 has introduced no free or assisted immigrants to its shores, and now, practically, there is no national system of emigration to Victoria. Of course men may go there at their own cost and take their chance, but the colony gives no help, and no special inducements are held out. In no other colony is there now a system of immigration so liberal and helpful as that which exists in Queensland. There is free and assisted immigration, and equivalent to a valuable gift of a farm of good agricultural land to every man, woman, and child above one year of age, who pay their own passage to the colony.

OPPOSITION TO IMMIGRATION.—Since 1879 only twenty-two free or assisted immigrants have been landed in Victoria, while during the same period 61,000 have been landed in Queensland. The thoughtful reader will ponder well this fact of the evident disposition of the colonies to discontinue free immigration as soon as possible. The policy or justice of such a system is doubted and debated. There are colonists who notice that it is a heavy tax on the resources of a young country, and who are influenced more by what immediately affects them in the way of taxation than by any patriotic or philanthropic considerations of the

general ultimate good. This feeling no doubt exists in Queensland, but it is only like the little leaven as yet, and has not made itself seriously felt. The successive Governments of late years and the great bulk of the people have recognised that consideration was due to their fellow countrymen, and also that an essential element of increased prosperity is an increased population.

IMMIGRANTS FROM THE UNITED KINGDOM.—The average number of immigrants from the United Kingdom during the five years 1882 to 1886 was 15,771 per annum, or equal to about nine immigrants every day. Taking a wider range of view, this is at once seen to be a mere trifle of the number of emigrants constantly leaving Great Britain, and a mere atom from the masses who should emigrate, and would probably, if they had the means or knew how to set about so great and desirable a change in their lives.

SMALL PERCENTAGE OF EMIGRANTS TO COLONIES.—EMIGRATION TO THE UNITED STATES.—According to the returns issued by the Imperial Board of Trade the emigrants from the United Kingdom in 1885 numbered 264,385, and of these 40,689, or only about 15 per cent. of the whole, went to the Colonies of Australia. The total number of emigrants from the United Kingdom in thirteen years, from 1873 to 1885, was 3,451,993, of which the United States received nearly 68 per cent., and the Australasian Colonies received only about 15 per cent.

EMIGRANTS LOST TO THE BRITISH EMPIRE.—For many years there has been this steady and continuous stream of emigration of British subjects to the United States. It averaged fully 727 every day during the above-named period of thirteen years, and still continues. Instead of every encouragement and information having been given, so as to influence and direct a fair proportion of these emigrants to the British Colonies of Australasia, they have been allowed to drift away to the United States, and so become subjects of an alien power; that is, they have become the subjects of a power that in its commercial policy puts protective and prohibitory duties on British-

grown or manufactured goods. Many of these, no doubt, would have preferred to remain British subjects, and with their energy, their skill, and, in many cases, their little capital, would have made most desirable colonists. Many have preferred the States because of their having friends there, others because of the shorter journey; but it is probable that a considerable portion would have preferred Queensland had its attractions been placed before them, and information concerning it been sown broadcast through the shires and towns of Great Britain.

GOVERNMENT DEPARTMENT.—AGENT-GENERAL'S DEPARTMENT.—AGENT GENERAL'S ADDRESS.—So important is this matter deemed to be by the Government and people of Queensland that a costly department is kept employed in London, under the direction of an Agent-General for the colony, and the chief business of this department is the supplying of information and the providing for the requirements of regular shiploads of emigrants to Queensland. The Agent-General is a member of the Queensland Government, and, in addition to the head office, local agents have been appointed in many of the chief towns of the United Kingdom. Application in person or in writing should be made to one of these for fuller information and details as to when vessels are leaving, port of embarkation, and any other information the intending emigrant may wish to obtain. The Agent-General's office is No. 1, Westminster Chambers, Victoria street, London, S.W.

There are several ways in which an emigrant may get to Queensland, according to his means or his preference, and one or another of these places Queensland within reach of tens of thousands of desirable colonists.

FULL-PAYING PASSENGERS.—LAND ORDER SYSTEM.—VALUE OF LAND ORDERS.—1st. He can pay his passage money in full, if he is able, and so inclined, and the passage money of his wife and family if he is married. A first cabin passage on board the magnificent British India Company steamers now costs £50, and a second cabin passage £32 10s., and a steerage passage £17. This is the best way in many respects. It secures to the emigrant some cabin

comforts and table indulgences which are not supplied to those whose passages are paid entirely or in part by the Government. But this is not the only nor the chief advantage. The Land Order system, which worked so well in the early days of the colony, has been revived, with safeguards to prevent its abuse. Persons twelve years old and upwards of both sexes going to Queensland receive land orders of £20 each, and of £10 each if between twelve months and twelve years. These land orders are different in one important particular from those formerly given to full-paying passengers—inasmuch as they are not transferable they cannot be sold and will be of no service except to those who intend to settle on the land. They have a purchasing power of £20 or £10 as the case may be as applied to Agricultural Farms, and a rent-paying power of the same amount as applied to either Agricultural or Grazing Farms. The amount of land which even £10 or £20 will buy in Queensland will be shown in the chapter on land selection. Nothing could be more helpful to the man of small means than this system, and nothing of the same kind is possible now in any of the other colonies. We have shown already that immigration to Victoria is practically at an end, so far as any Government assistance is concerned. Assisted immigration to New South Wales ceased at the end of 1886, and for 27 years had only amounted to an average of a fraction over 2,855 each year. Doors that used to be wide open are one after another being gradually closed and finally shut, and no colony can now vie with Queensland in its assistance and attractions combined to the intending emigrant.

But there are many who are unable to pay their own passages, and these, if desirable as colonists, can obtain free or assisted passages, or can be forwarded as “nominated” passengers. The persons most eligible as free or assisted passengers are farmers and farm labourers, and domestic servants.

FORM OF APPLICATION.—The following schedules give much information as to what is necessary to be done and any further information can be obtained from the Agent-General's Office, as stated above:—

SCHEDULE B.

No. 1.

Assisted, Free, or Nominated.

Queensland.

Register.....

FORM OF APPLICATION.

No.....

This Form, when filled up, is to be *separated* from the other page and returned as a *letter prepaid*, addressed to the AGENT-GENERAL for QUEENSLAND, 1 WESTMINSTER CHAMBERS, VICTORIA STREET, LONDON, S.W., who will forward all selected Emigrants in the Ships sailing under his direction for Queensland.

Amount to be paid for	statute adults	£ s. d.	£ s. d.
Amount to be paid for	ship's kits ...	} Total	

Name of Party applying for Passage.	Age at last Birthday.	Amount to be paid.	County where Born.	Day and Year when Born.	State whether Vaccinated or had the Small- pox.	Can the Applicant Read and Write: Say "Yes" or "No" opposite name.	
						Read.	Write.

Trade or calling of Applicant; and if
not now engaged in h original calling,
state when ceased to be so employed }

Place of Residence... ..

Post Town Street	County
---------------------	--------

If the Applicant has since been em-
ployed in any other way than above,
state in what way and how long
has been so engaged }

Name, Address, and Occupation of some
late Employer, and the time the Appli-
cant worked for him }

Name and Address of the Minister of
the Parish in which the Applicant
resides }

Has Applicant been in receipt of Parish
relief, and, if so, for how long }

Has Applicant been out before to any
Colony, and, if so, to which }

SCHEDULE B—*continued.*

I do solemnly and sincerely declare that all the above statements are true; and that I have carefully read or have heard read the directions contained in the paper attached to this form, and that in applying for a Passage to the colony I am truly acting in accordance with the spirit of those directions, which I understand to be this:—That the privilege of a Passage, if granted, will be allowed me on the faith that I really belong to the classes named: and of good character; have never been convicted of crime, and that I have never previously resided in any of the Australian Colonies; and that I proceed to Queensland, intending to remain there, and not with the view of going to any other colony; and that, in the event of my obtaining a Passage to the colony, I hereby undertake to remain in Queensland for at least twelve months from the date of my arrival; and I further declare that I have neither paid, nor agreed to pay, for the purpose of obtaining a passage, any fee or gratuity whatever to, or for the use of, the party through whom this application is made, or anyone else. I also engage to conform to the directions of the appointed officers, and to such regulations as may be established for the good government and welfare of all during the voyage; and I pledge myself not to leave the ship until she reaches her destination.

Signature of Applicant:

**CERTIFICATE TO BE SIGNED BY PRESENT OR
LATE EMPLOYER.**

I CERTIFY that _____, now residing at _____ has been employed by me for a period of _____ months, in the capacity of _____, and that I believe _____ to be competent in calling, and to be a person of unexceptionable character, never to my knowledge having been convicted of crime.

Signature: _____ Residence: _____ Post Town: _____

CERTIFICATE OF A PHYSICIAN OR SURGEON.

I CERTIFY that I have examined the above named applicant, _____, and that _____ is of sound bodily and mental health, and is not afflicted with any disease calculated to shorten life or to impair physical or mental energy. I certify also that _____ has had the small-pox or has been vaccinated, and is entirely free from any disease usually considered infectious or contagious, and that _____ is capable of labour in _____ calling.

Signature: _____ Residence: _____

N.B.—Any free, assisted, or nominated emigrant who obtains a passage and arrives in Queensland with the intention of immediately proceeding to another colony, will be deemed to be guilty of a misdemeanor, and be liable, on conviction, to twelve months' imprisonment. Leaving or attempting to leave the colony within three months after arrival will be considered as prima facie evidence of the intention.

** * This paper must be kept clean, and will be returned unless filled up exactly according to the directions given above. Nothing additional must be written on the form; any remarks the applicant wishes to make must be by letter. No erasures or mutilations must be made.*

Queensland Government Emigration Offices,

London.

Issued

, 188

This margin must not be cut away.

It is particularly requested that no one will sign these Certificates unless convinced of the truth of their statements.

This half-sheet to be kept by the applicant.

ASSISTED OR FREE.

QUEENSLAND GOVERNMENT EMIGRATION OFFICES,
LONDON.

DIRECTIONS TO BE OBSERVED BY PERSONS WANTING FREE OR ASSISTED PASSAGES TO QUEENSLAND, AND THE CONDITIONS ON WHICH THE PASSAGE WHEN GRANTED MUST BE UNDERSTOOD TO BE ACCEPTED.

DESCRIPTION OF PERSONS ELIGIBLE.

1. The Queensland Government grant passages to persons eligible as to occupation, and passed at the Queensland Government Emigration Office, on the payment, per adult, of the amount mentioned at the bottom of first page; two children of twelve months, and under twelve years of age, counting as one adult.

2. The class of persons eligible are domestic servants, farmers, farm labourers, vine dressers, labourers, and mechanics, and their families. By "Labourers" is to be understood those whose labour has been connected in some way with the land, such as farm-servants, gardeners, road-makers, miners, quarry-men, navvies, and the like; and such other persons as the Agent-General, with the authority of the Government of the colony, deems eligible. By "Mechanics," such as engineers, engine-fitters, engine-drivers, railway carriage builders, carpenters, bricklayers, stonemasons, blacksmiths, wheelwrights, shipbuilders, and the like.

3. All the adults must be capable of labour. The candidates most acceptable are young married couples without children, families with a large proportion of daughters over 14 years of age, and female domestic servants of good character.

4. The separation of husbands and wives, of the parents from children under 15, will in no case be allowed.

5. Single women cannot be taken without their parents, unless they go under the immediate care of some respectable married couple, or are willing to be placed under the care of the person appointed as matron on board the ship.

6. No persons, whether adults or children, can be accepted unless they have been vaccinated or have had the smallpox.

7. No applicant will be accepted without decisive certificates of good character and of efficiency in his professed trade or calling.

And Certificates of Marriage will be required, also extract of the Register of Births or the Certificate of Baptism, *specifying the age*, for any children under twelve years; or if these cannot be procured, a declaration of age signed before a magistrate and witnessed by him, *and these must be sent up with the form, all the spaces being carefully filled up exactly in accordance with these directions.* Declaring Forms for age of children may be obtained at the Queensland Government Emigration Office, No 1, Westminster Chambers, Victoria Street, London, S.W.; but the Declaration Form must not be used except in cases where the Register of Birth or Certificate of Baptism, specifying the age, cannot be procured.

APPLICATION AND APPROVAL.

8. Applications must be made in the form annexed, which must be duly filled up and attested, as explained in the form itself, and then forwarded to the Queensland Government Emigration Office with an intimation of the probable date it will be convenient for the applicants to embark. *The Certificates of Birth and Marriages, as above explained, to be sent with the form.*

9. *It must be distinctly understood that the filling up the Form confers no claim to a passage unless the candidates are deemed desirable for the Colony and can be accepted consistently with the shipping arrangements at the time the application is made.*

10. If approved of, the applicants will receive a passage as soon as arrangements will admit. *But no preparation must on any account be made by the applicants, either by withdrawing from employment or otherwise, until they have received answers stating that they are accepted, and have also received notice of the ship in which they are to embark, and of the time and place of joining her.*

11. Should it be found that any of the signatures attached to the certificates are not genuine, or that any other deception is attempted, the application will be rejected; or should anyone, on personal examination at the port of embarkation or on board, be discovered to have made any misstatement whatever with regard to age, trade or calling, health, &c., such person will not be allowed to proceed in the ship. To prevent disappointment, therefore, applicants should be very careful to have their trade or calling and ages correctly stated in their Application Form.

SUBSEQUENT PROCEEDINGS.

12. If after the arrival at the port of embarkation of persons receiving these passages, they or any of their family are found not to be in a fit state of health to embark, or have any mental or bodily defect likely to impair their usefulness as labourers, or to have left any of their young children behind, or to have brought with them more children than are mentioned in their application form, they cannot be received on board the ship; or, if embarked, must be landed again without having any claim for a passage.

13. If any persons fail to attend at the appointed time and place for embarkation, or to proceed in the ship, or are rejected for any of the reasons specified in the preceding directions, they will not be able to claim a passage by any future ship.

14. Provisions and medical attendance will be supplied by the ship. Persons must bring their own clothing, which will be inspected at the port by an officer; and all parties are particularly desired to observe that they will not be allowed to embark unless they provide themselves with a sufficient supply for the voyage. The lowest quantity that can be admitted for each adult is as follows:—

OUTFIT OF CLOTHING.

For Males.

Six shirts
Six pairs of stockings
Two warm flannel or Guernsey shirts
Two pairs of strong shoes
Two complete suits of strong exterior clothing.

For Females.

Six shifts
Two warm and strong flannel petticoats
Six pairs of stockings
Two pairs of strong shoes
Two strong gowns, one of which must be warm.

But for each child nine shirts or shifts, four warm flannel waistcoats, and one warm cloak or outside coat, six pairs of stockings, two pairs of strong shoes, and two complete suits of exterior clothing, are required. In the case of emigrants proceeding to the colony by the Torres Straits mail steamers this outfit may be varied at the option of the Agent-General.

15. The articles contained in either of the subjoined lists must be also paid for by persons receiving these passages, but will be supplied to them on their joining the ship. For this purpose they will be required

to send up the money named at the top of this schedule, making in all £1, to the Queensland Government Emigration Office, on the following scale for each adult :—

Outfit for 20s.

1 Bed and pillow...	} 20s.
1 Pair blankets ...	...	...	...	...	...
1 Do. sheets ...	...	...	...	...	...
2 Canvas bags ...	...	...	...	...	...
1 Wash basin ...	...	...	...	...	...
1 Plate ...	...	...	...	...	...
1 Pint drinking mug ...	...	...	...	...	...
1 Quart do. do. ...	...	...	...	...	...
1 Knife and fork ...	...	...	...	...	...
2 Spoons ...	...	...	...	...	...
3 lbs. soap	}
1 Brush ...	...	...	...	...	...

These things, together with the necessary brushes and combs and clothes-brushes, for cleanliness, must be provided also by persons receiving these passages. They must not have less than the above outfit, but the larger the stock of clothing the better for health and comfort during the voyage, which usually lasts three or four months, and as the voyagers have always to pass through very hot and very cold weather, they should be prepared for both. Two or three coloured serge shirts for men, and an extra supply of flannel for women and children, are strongly recommended. These remarks apply to emigrants *going to Queensland* by the old route—*via* Cape of Good Hope.

16. It is desirable that parties should take out with them the necessary tools of their trade. Bulky agricultural implements, however, cannot be admitted on account of their inconvenience, size, and weight; neither can furniture be received on board. Feather beds are especially prohibited.

17. The whole quantity of baggage for each adult person must not measure more than 20 cubic or solid feet, nor exceed half a ton in weight. It must be divided into two or three boxes, the contents of which must be closely packed, so as to save space in the ship, and the owner's name should be legibly painted thereon with white paint. Large packages and extra baggage will not be taken unless paid for, and then only in case there be room in the ship.

18. Each family will be allowed to take only its own luggage. Any violation of this rule will subject the party to a forfeiture of his passage.

19. On arrival in the colony all passengers, unless going out under special agreement, will be at perfect liberty to engage themselves to anyone willing to employ them, and to make their own bargain for wages. They will be expected strictly to observe on board the regulations framed with a view to their health and comfort during the voyage.

Scale of Payments for Assisted Passages.

Sex.	Between one and twelve years.	Between twelve and forty.	Above forty and under fifty-five.
	£	£	£
Male	4	8	12
Female ...	2	4	12

Any person wishing to emigrate to friends who are already settled in Queensland can do so in another way than that which has been just mentioned. That is, they can get any friend or relation in the colony to **NOMINATE THEM FOR A PASSAGE**. It is done in this way—The relation or friend in Queensland applies to the local Emigration Agent for a passage, and at the same time deposits money as per the following scale for each :—

Person Nominated.

Sex.	Between one and twelve years.	Between twelve and forty.	Above forty and under fifty-five.
	£	£	£
Male ...	2	4	8
Female ...	1	2	8

55 is the limit of age, after that must be full payers.

Whereupon he gets a passage warrant, available for twelve months, which he forwards to the friend or relation in England, who shall produce the same to the Agent-General, and then exactly the same course must be pursued as in the case of the assisted or free emigrant.

On arrival in the colony emigrants are housed in the Immigration Dépôt until they have had time to make a hiring agreement. Such dépôts are found at various of the coast towns of the colony, so that if an emigrant wishes to stay at any particular town he has only to mention it to the authorities when applying for a passage. Passengers should see that the name of the town they desire to land at is written on their Passenger's Contract Ticket. It must distinctly be remembered that the penalty for any assisted, free, or nominated emigrant attempting to leave the colony within three months after arrival is rigidly enforced. But if any emigrant wishes so to leave within three months after his arrival he can do so provided he pay to the local Immigration Agent a sum equal to that contributed by the Government for his passage to the colony.

Many persons anxious to emigrate to this colony, and who are able to pay their full passage money prefer to make the voyage in one of the ships chartered by the Agent-General for emigration to Queensland, because such a fact is a guarantee that all conduct on board will be orderly, and that discipline will be maintained, and that the comfort and health of the passengers will be properly attended to. Any person, however, who sails in one of these chartered vessels must comply with all the rules as laid down for the conduct of the ship, and must take his place with the rest in the duties allotted by the Surgeon Superintendent. The fact of having paid the whole of the passage money is no excuse for exemption from such duties.

BRITISH INDIA COMPANY'S STEAMERS.—Nearly the whole of the emigrants to Queensland are conveyed by the noble steamers of the British India Company, and a small proportion by sailing vessels. The number carried by the former in 1886 was 10,695, and those by sailing vessels numbered 1,184. A few were also carried by subsidiary or "short ships."

DURATION OF VOYAGE. — The voyage by steamer occupies about fifty-five days; by sailing vessels the time is, of course, longer, and the duration of the voyage is more uncertain. To most emigrants the journey is like a pleasure trip. Every sanitary precaution is taken, the food is abundant and good, amusements of various kinds are indulged in; a duly qualified doctor and a matron accompany each emigrant vessel; and were it not for the eagerness and hopefulness concerning the new land and the new career, most emigrants would feel reluctant to terminate the novel and pleasant existence which they have had for a few weeks on board ship.

BEST TIME TO ARRIVE.—CLIMATE OF THE COLONY.—The voyage *viâ* the Suez Canal and Torres Straits is full of incident and interest. Care should, however, be taken not to undertake the voyage at the time of the year when it will be midsummer in passing through the tropics and the Canal. If possible, it is desirable for the new comer to arrive in Queensland between the months of April and September; he will then find that he has sailed to a land whose climate during these months is simply perfection, and will so become acclimatised as not to be distressed by the greater heat of the summer months. The climate of the colony is thoroughly adapted to the constitution of Europeans, and there are few who, after being in it a few months, will not readily admit that it is far more delightful than the climate of the British Isles. The days are never so long, but they are never so short. A few days of oppressively hot weather in summer are generally terminated by a thunderstorm, after which the air will be deliciously cool and pleasant for days or weeks. The sea breeze blows refreshingly over the land almost as regularly as the days come and go. The short, miserable, foggy days, and the long and miserable nights of northern winters, are unknown. Blue skies, sparkling seas, bright sunshine, and

an exhilarating atmosphere are the normal condition, the regular environment, of Queensland. Very many colonists, after years of life in the colony, take a trip to the "Old Country," but very few remain there. Memory may turn and cling to the old land, but living ties and interests and hopes draw back more powerfully to the young and the new.

EMPLOYMENT GENERALLY PLENTIFUL.—On arrival at any of the chief ports of the colony the immigrant will be accommodated for a short time, if he wishes, at the Immigration Dépôt. In ordinary good times all classes of workers soon find employment. Single girls, as domestic servants, are always engaged at good wages within a day or two of their arrival. The new comer must be willing to work; he must not be fastidious as to what he works at, nor exacting in what he works for, and then before long he will fall into the ranks, he will find a place in the hive, sharing the toil but sharing the spoil also, with all Queensland before him with its possibilities of progress and gain and happiness.

CHAPTER III.

AGRICULTURAL RESOURCES.

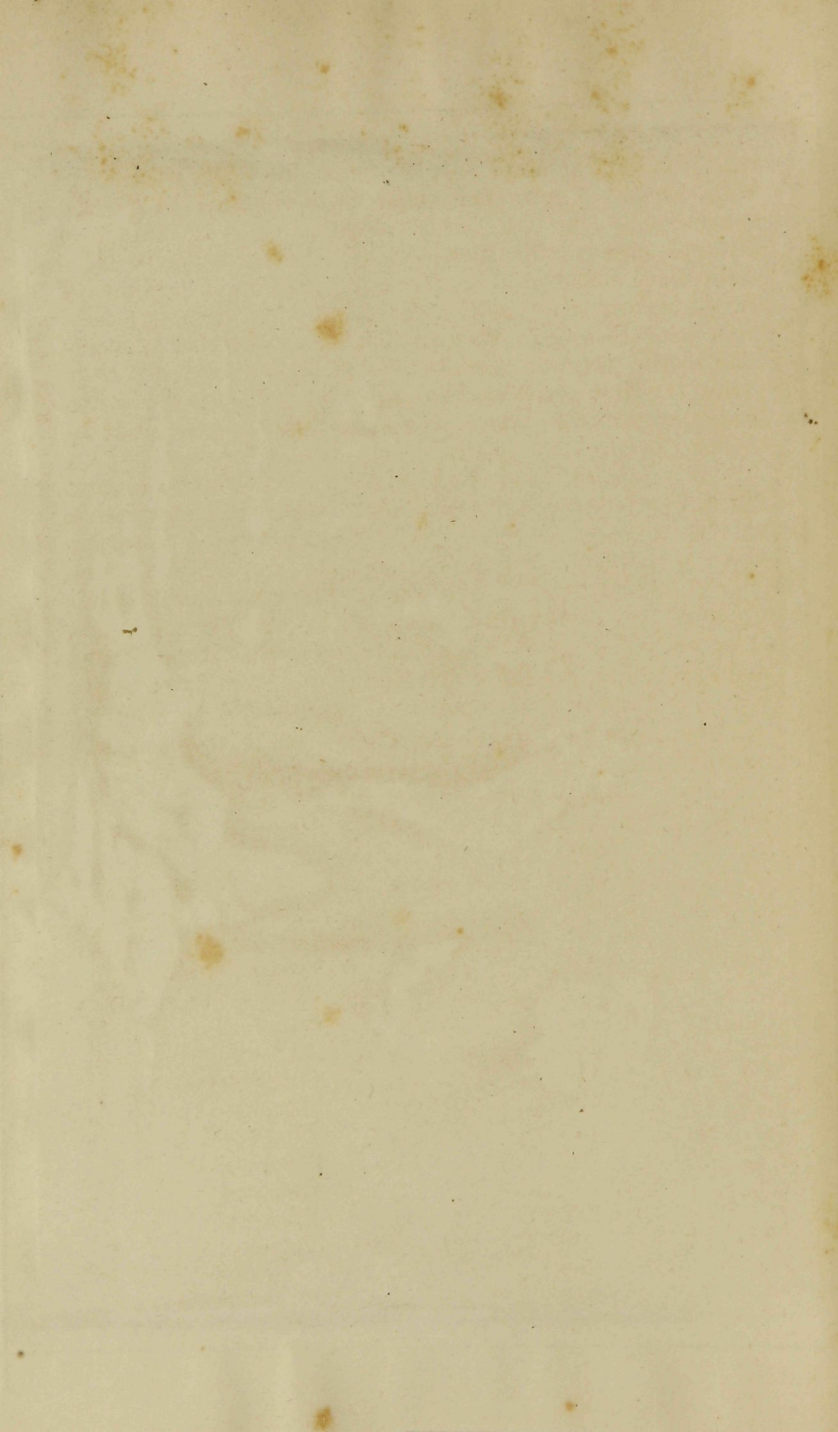
But the intending emigrant naturally wishes for definite information as to what can be done in Queensland when he gets there. A short holiday, a pleasant voyage, and glimpses of strange lands and strange faces by the way, will not compensate for the breaking up of even a poor home in one hemisphere if there is no prospect of a better in the other.

GENERAL INFORMATION.—In endeavouring to supply such information we will, first of all, give some idea of the agricultural industries and resources of the colony. We shall, in this, confine ourselves to broad outlines. Any reader wishing for more detailed information and instruction will find both in the series of "Papers for the People," which are appended to this volume.

PASTORAL INDUSTRY.—From what has been stated in the preceding chapters, the reader will have concluded that the great bulk of the land is either not utilized at all or



SETTLER'S HOUSE.



that it is held by some sort of tenure, by a few tenants, in large areas. The latter conclusion is nearest the truth. Queensland, like the other colonies, was, in the first instance, and is still chiefly, a pastoral country with large sheep and cattle stations in every direction. Some of these stations or consolidated runs are of greater extent than some European States. The attractions of Queensland to the pastoral tenants we will deal with further on, giving the first place in order to what is intrinsically the first in importance—the agricultural pursuits and possibilities of the colony.

The official returns show that in 1886 there were 221,843 acres of land under cultivation, being an increase of 12,173 acres on the preceding year. The detailed returns give some idea of the various crops which may be grown, but, in addition to these, there are many other things which can be cultivated most successfully, but which, from want of inclination or capital or technical knowledge and experience, are not cultivated to any such extent as to have any statistical or commercial value.

ACREAGE OF DIFFERENT CROPS IN 1886.—ABSENCE OF ARTIFICIAL AIDS.—Of the total area under cultivation—

15,665	acres	under	Wheat
11,099	”	”	Oats
2,006	”	”	Barley
76,481	”	”	Maize
887	”	”	Rice
4,952	”	”	Potatoes
2,250	”	”	Sweet Potatoes
15	”	”	Cotton
54,010	”	”	Sugar
255	”	”	Arrowroot
1,110	”	”	Grape-vines
1,497	”	”	Bananas
411	”	”	Pine-apples
751	”	”	Oranges
29,149	”	”	Lucerne
1,821	”	”	Panicum
90	”	”	Tobacco
388	”	”	Sorghum
674	”	”	Other crops
2,530	”	”	Gardens and orchards

The above list gives a fairly accurate account of what has been done, but only a type and prophecy of what will be done in Queensland in the way of horticulture and agriculture. There is hardly any limit to the variety of field, garden, and orchard products that may be grown in different parts of Queensland; and with regard to the quantities, the returns obtained have been for the most part the result of rough and primitive husbandry. The urgent demands of human necessity, the facilities of transit to numerous and regular markets, the artificial appliances, and the careful and scientific tillage of England have never put either the soil or its cultivators to any real test, and until equal methods and appliances are used all comparisons must be defective.

And yet Queensland need not fear comparison with any country in the variety of the products of the soil. The above is a list of which any country might be proud. In several of these products Queensland excels, and in others she bears favourable comparison with the lands to which some of these roots, grains, and fruits are supposed to be indigenous.

VEGETABLES AND FRUITS.—SOME FRUITS ALWAYS IN SEASON.—But in addition to the above the following vegetables and fruits grow readily, and with ordinary care, to perfection and in abundance:—Cabbages, all the various kinds, beans, onions, carrots, turnips, vegetable marrows, cucumbers, pumpkins, celery, green peas, beet-root, lettuce; figs, guavas, custard apple, mulberries, passion fruits, granadillas, bananas, watermelons, mangoes, pine-apples, peaches, nectarines, loquats and many other tropical and semi-tropical fruits. So varied are the soil and the climate in different localities that some kind of fruit is always in season, and there are places where English fruits, such as apples, pears, plums, strawberries, &c., grow to perfection and where the trees bear abundantly.

The following quotations of average retail prices of fruit apply to Brisbane, and some other of the southern and coastal towns, but away in the far north and west fruit is sometimes very scarce and very dear, owing to the risk and cost of carriage:—

Grapes	at	from 3d. to 5d. per lb.
Pine Apples		„ 2d. „ 6d. each.
Bananas		„ 4d. „ 8d. per doz.
Oranges (imported)		„ 1d. „ 2d. each
Oranges (Queensland)		„ 5d. „ 10d. per doz.
Apples (imported)		„ 1d. „ 2d. each
Water Melons		„ 2d. „ 1s. each
Passion Fruit		„ 3d. „ 6d. per doz.
Peaches		„ 2d. „ 5d. per doz.

These are about the average prices for these fruits when they are in season ; anything early in the market, or exceptionally large and fine in quality, will, of course, bring higher prices.

NEGLECT OF FRUIT-GROWING. — VALUE OF FRUIT IMPORTED AND EXPORTED.—Fruit-growing is, however, a neglected industry, not receiving near the amount of attention which it deserves. The home products have to be largely supplemented by importations from the other colonies, in order to meet the demand. There are grand opportunities of doing well in this delightful industry for men with a little money and the necessary knowledge and experience. The value of the green fruits, plants and vegetables, imported into Queensland for the period of five years, ending in 1886, was £580,721, from which the colony derived no revenue, these things being admitted duty free. The total value of the green fruits, plants, &c., exported during the same period was only £37,813, leaving a difference between imports and exports of over £100,000 per annum, the great bulk of which was spent for what might be grown in the colony ; nothing could more strikingly show the existence of a good market for such products, which is the best encouragement to their cultivation. Some of the southern colonies, notably Tasmania, can produce English fruits more easily and plentifully than they can be produced in Queensland, except on the uplands, but the latter colony grows many things in the shape of tropical and semi-tropical fruits which cannot be grown by her southern neighbours at all. Vegetable gardening is almost totally neglected by Europeans.

GRAPE GROWING AND WINE MAKING.—The growth of these kindly fruits of the earth, in the future, will

afford congenial and profitable employment to hundreds where at present only one here and there is employed. The fruit-growing capacities of the Queensland soil and climate are practically unlimited. Grapes, in every variety, grow luxuriantly in the poorest soil provided it is trenched and drained, and the making of wine is already an industry of some importance and considerable promise.

We have already placed before the reader certain information with regard to the acreage under crop with different agricultural products, and now revert to this subject again, in order to show what inducements there are to engage in agricultural pursuits in Queensland. Does farming pay? Do the returns per acre and the market prices compare favourably with those of other lands in which agriculture is one of the chief pursuits of the people? In replying to such inquiries as these we shall again make free use of comparisons.

WHEAT—AVERAGE YIELD.—This cereal has been grown for many years in Queensland, chiefly on the Darling Downs and in the neighbourhood of Warwick. The one great drawback to its cultivation is its liability to a disease known as rust. Many attempts have been made to counteract this disease, but the success has been only partial hitherto. Taking a period of ten years, from 1877 to 1886, inclusive, the total gross acreage sown with wheat was 135,793 acres. Of these, 28,051 acres were mown for wheaten hay; 181 acres were cut for green feed, and 38,267 acres were unproductive. The balance of 69,294 were divided, statistically, into two classes—that which was affected by rust and that which was not. The average yield of what was affected by rust was 10 bushels 44½ pounds; the average yield of what was free from rust was 14 bushels 58½ pounds. Taking the yield all round, the average was 12 bushels 51 pounds. Taking the total area sown with wheat, and applying to it the test of the total yield, including in the average the entirely unproductive acres, we have an average yield of a little over 9 bushels to the acre. And this last is really the only thorough test as to the profitableness or otherwise of wheat-growing.

COMPARISON OF WHEAT RETURNS.—If this severe but accurate mode of averaging is the same as is

followed in other countries, then the following figures may be regarded as being thoroughly reliable for all comparative purposes. For a period of ten years the following have been the average yields, omitting small fractional portions:—

Queensland	...	9 bushels per acre.		
New South Wales	15	"	"	
Victoria	...	10	"	"
South Australia	...	$7\frac{1}{2}$	"	"
Western Australia	12	"	"	
Tasmania	...	$18\frac{3}{4}$	"	"
New Zealand	...	$25\frac{3}{4}$	"	"

The average yield in—

The United Kingdom	is 27	"	"	
France	...	17	"	"
Italy	...	12	"	"
United States	...	12	"	"
Russia in Europe	...	$4\frac{3}{4}$	"	"

The highest yield in any of the above years in Queensland was in 1880, when the return was $21\frac{1}{2}$ bushels. There is reason to believe that that yield will be excelled by the crop which is now maturing at the beginning of 1888.

MEDIUM POSITION OF QUEENSLAND.—SEASONS OF DROUGHT.—It will be seen that Queensland occupies a medium position with regard to this crop. Rust is the great enemy, but it may be further explained that during the three years 1883 to 1885, Queensland passed through a season of terrible drought, which not only seriously affected the wheat crop, but also almost every other crop—a drought which destroyed tens of thousands of sheep and cattle, caused well-nigh a monetary panic, and ruined, for a time at least, many colonists both in town and country. Queensland, however, in common with the other colonies, is liable to these periodic droughts, and the farmer must reckon on their recurrence at intervals in making his calculations.

POWERS OF RECOVERY.—The country has wonderful powers of recovery, and two or three good seasons soon put things right. The Registrar-General points out that the wheat not affected by rust in 1886 yielded $17\frac{1}{3}$ bushels

to the acre, and furnishes "a sufficient proof of what could be done with this crop in Queensland were it possible to discover any specific for rust."

OATS.—COMPARATIVE YIELD OF OATS.—This grain is sown chiefly for the purpose of raising green feed and making oaten hay. Of the total area sown in 1886, amounting to 11,099 acres, only 138 acres were reaped for grain. These few acres yielded 1,438 bushels, being an average of $10\frac{3}{4}$ bushels per acre. The average yields of this crop are—

Australasia (generally),	24 bushels per acre.
United Kingdom ...	$34\frac{3}{4}$ " "
Cape of Good Hope ...	8 " "
United States ...	26 " "
Germany ...	21 " "
Russia in Europe ...	12 " "

COMPARATIVE YIELDS OF HAY.—There is little care bestowed on this crop in Queensland, except for hay and green feed. The average yield of hay in—

Queensland ...	is	$1\frac{6}{10}$ tons per acre
New South Wales	"	$1\frac{4}{10}$ " "
Victoria ...	"	$1\frac{2}{10}$ " "
South Australia	"	$1\frac{1}{10}$ " "
Western Australia	"	$1\frac{2}{10}$ " "
Tasmania ...	"	$1\frac{3}{10}$ " "
New Zealand	"	$1\frac{2}{10}$ " "
United States	"	$1\frac{2}{10}$ " "

Queensland occupies a leading position as a hay-producing country, from artificial grasses, but improvement in quality and appearance is possible and desirable. Thanks to the many agricultural shows now held annually in the colony, and the keen competition of some of the neighbouring colonies, more attention is being paid to the get-up of hay for market, and first-class quality and first-class workmanship in baling are now often seen where stained and unsightly bundles used to be sent to market, to the loss of the growers and the disappointment of buyers.

GROWTH OF BARLEY.—Barley is sown for green feed also, and sometimes for hay. In 1886 768 acres were reaped for grain, and yielded 24 bushels to the acre.

Average yields.

Australasia (generally)	19 bushels per acre
United Kingdom ...	35 " "
Cape of Good Hope	15 " "
United States ...	22 " "
Russia in Europe ...	7 " "

AVERAGE YIELD OF MAIZE.—This is the chief crop, of Queensland, in the extent of land devoted to its cultivation. In 1886 there were 76,481 acres planted with this grain; and the yield from 75,566 acres was 1,709,673 bushels. In this crop Queensland has nothing to fear from her neighbours. Some of them do not grow it at all, and none of them, with the exception of New South Wales, to the extent to which it is grown in Queensland. For the ten years, 1877 to 1886, the average yield has been a little over 27 bushels to the acre.

GROWING IMPORTANCE OF RICE CULTIVATION.—Rice is practically a new crop, but it was deemed to be of such growing importance and so full of promise that the Registrar in 1886 wisely gives it separate record in the statistical returns. In that year, 887 acres were planted, and yielded 24,876 bushels; being an average of fully 28 bushels per acre.

AVERAGE YIELD OF POTATOES.—This valuable tuber thrives well. Prior to 1884, the two kinds, *Solanum tuberosum* and *Batatus edulis*, commonly known as the English potato and sweet potato, were not kept distinct from each other in the Queensland returns. Since then the average returns for three years of the English potato crop has been slightly over 2 tons to the acre. The average yield of the following countries is for a period of thirteen years, from 1873 to 1885:—

New South Wales ...	$2\frac{9}{10}$ tons per acre
Victoria ...	$3\frac{1}{3}$ " "
South Australia ...	$3\frac{1}{5}$ " "
Western Australia ...	$2\frac{8}{10}$ " "
Tasmania ...	$3\frac{4}{10}$ " "
New Zealand ...	$5\frac{2}{10}$ " "

It is unfortunate that the returns of Queensland are only available for a period of three years, for purposes of com-

parison, as that period includes the time of the terrible drought already alluded to, and excludes some good seasons that went before. It may fairly be assumed that Queensland is quite equal to New South Wales, South Australia, Victoria, and Western Australia, as a potato-growing country.

TWO CROPS OF POTATOES AND MAIZE EACH YEAR.—It should be mentioned here, as a most important item, that two crops of maize and two crops of potatoes are readily obtained every year in Queensland. Many varieties are grown, confined to no particular district, but not thriving well in the northern parts of the colony.

SWEET POTATOES—INVALUABLE FOR FEEDING STOCK.—Queensland is also thoroughly adapted to the growth of the sweet potato, and in this has a great advantage over the neighbouring colonies. This is a delightful and nutritious root, of easy growth and enormous yield. There is no outlay for seed, as it is grown from stems of its own foliage, and it yields a heavy growth of tops which are the delight of horses, pigs, and cattle; it produces a far more abundant root crop than the ordinary potato. Like sugar and maize it does not like frost, and Queensland has to supply her southern neighbours with this commodity. The yield since 1884 has averaged within six tons to the acre. Many people prefer it far before the English potato. For feeding and fattening purposes it is invaluable for stock; horses, cows, pigs, and poultry eat it with avidity. These tubers are of all sizes and shapes, and have been known to grow to ten, eighteen, and even thirty pounds weight.

COTTON.—DECLINE OF COTTON CULTIVATION.—This, at one time, was extensively cultivated and promised well as an industry under the stimulus of a liberal Government bonus to the growers. Its cultivation originated during the American civil war, and Queensland was regarded as the country from whence large supplies would be derived by the cotton-spinners of England. Between 1868 and 1872 over twelve thousand acres were under this crop, but with the withdrawal of the bonus the growth of cotton has gradually dwindled down year by year to almost nothing. This is owing, simply, to Queensland being unable to

compete with the cheap labour of the South American States and other cotton-growing countries. It is creditable to both the Government and the people of Queensland that the colony has no desire for, and offers no inducement to, industries which can only be made profitable to the few by the slavish toil and utterly inadequate payment of the many. The decision of the people has been tacitly agreed upon in this matter as surely as it has been avowedly with regard to the growth and manufacture of sugar. That Queensland can grow abundance of splendid Sea Island cotton is beyond a doubt, but that she will not do it with black slaves or the slavish unremunerative labour of her own men, women and children is equally certain.

Meanwhile it is an industry that may some day be revived, under altered conditions of social life, or when the price of the product or the cost of labour shall have advanced in those lands where cotton is now the chief article of cultivation.

AVERAGE UNDER SUGAR CANE.—COMPARISON WITH NEW SOUTH WALES.—RAW SUGAR EXPORTED.—RAW SUGAR IMPORTED.—REFINED SUGAR EXPORTED.—REFINED SUGAR IMPORTED.—This, in point of value, is the first, and in the area under cultivation the second in importance of Queensland's crops. There were 54,010 acres under cultivation in 1886, and of these 34,657 acres were cut and crushed, for a yield of 58,545 tons of sugar. This gives an average of 1.69 tons of sugar to every acre of cane crushed. In this industry, which combines both agriculture and manufacture, Queensland stands peerless. She has no competitor excepting New South Wales, which colony she far surpasses in acreage under crop, annual returns, percentage of yield, and general adaptation to the extensive and profitable growth of the sugar cane. The difference between the two colonies as sugar-producing countries will be seen in the following comparisons:—

Total area under crop in Queensland in 1886, 54,010 acres.
Total area under crop in New South Wales in 1886,
15,117 acres

Total area crushed in Queensland in 1886, 34,657 acres
Total area crushed in New South Wales in 1886, 5,915
acres

Total value of sugar obtained, Queensland, 1886,
£1,125,284

Total value of sugar obtained, New South Wales, 1886,
£98,676.

The relation in which Queensland stands with regard to other countries so far as the sugar trade is concerned will be seen in the following Custom-house returns. In 1886 Queensland exported the following quantities of raw sugar:—

17,887	tons	3	cwts.	to	New South Wales
9,387	„	2	„	„	Victoria
368	„	19	„	„	South Australia
32	„	6	„	„	Tasmania
784	„	3	„	„	New Zealand
3,587	„	3	„	„	Hong Kong
1,200	„	9	„	„	United Kingdom

And various smaller quantities to other places, making a total of 33,259 tons 4 cwts. of raw sugar exported, and valued at £621,935. The total quantity of raw sugar imported was only 427 tons 5 cwt. 3 qrs., the value of which was £10,072. Queensland thus exported over sixty-one times as much raw sugar as she imported. During the same year Queensland exported—

6,001	tons	3	cwts.	of refined	sugar to	New South Wales
2,435	„	0	„	„	„	Victoria
1,204	„	0	„	„	„	South Australia
1,341	„	10	„	„	„	New Zealand
184	„	0	„	„	„	Tasmania
85	„	0	„	„	„	United Kingdom
0	„	3	„	„	„	German New Guinea

Making a total of 11,250 tons 16 cwts. of refined sugar exported of the estimated value of £233,575. The total quantity of refined sugar imported into Queensland was only 37 tons 12 cwt. 1 qr., the value of which was £901. Queensland thus exported nearly 260 times as much refined sugar as she imported. In the item of sugar exports alone as against imports Queensland gained in the one year £844,537.

UNRIVALLED ADVANTAGES.—CENTRAL SUGAR MILLS.
—DESIRE TO PROMOTE SUGAR GROWING IN SMALL
HOLDINGS.—This leading position has been attained in a

few years, and there is no doubt that it will be more than maintained in the future. So long as sugar can be grown and made profitably anywhere in Australia it can be grown and made more easily and profitably in Queensland than anywhere else. As an industry it has had its reverses, but it is now too firmly established to be subject to any permanent injury. From one end of the land to the other sugar cane is grown and mills have been erected. The extent of these plantations and mills, with their cultivation, tramways, barges, machinery, refineries, distilleries, &c., may be imagined when it is stated that some of them have had as much as £70,000, £80,000, and in some cases considerably over £90,000 spent upon them. But it is an industry in which the small farmer and the capitalist can engage with mutual and proportionate profit and advantage. Hitherto coloured labour, in the shape of South Sea Islanders, has been largely employed on the plantations, but there was a strong public feeling against it. The number of these is being reduced gradually, and a law has been passed terminating the introduction of this class of labour after the year 1890. Another peculiarity of this industry is that the Government, desiring to encourage this class of agriculture in small holdings, and knowing that it was not possible for each small farmer to erect a mill of his own, are erecting central mills, by parliamentary authority and at the public cost. These mills are to be conveniently placed amongst a number of small farms, the owners of which enter into a compact with the Government, and the Government mills crush the cane and make the sugar in behalf of the farmers. The custom hitherto has been for the large mills, owned by companies or private holders, to give the small farmers so much per ton for their cane. This was not always deemed to be satisfactory, the price given for the cane not being deemed adequate, and sometimes the mill-owners had so much cane of their own that they did not care to buy the cane of other growers at all. It is hoped that these Government mills will remedy some of these evils and do away with the causes of complaint. The desire is to engage a large number of small farmers in sugar-growing in preference to the industry being left to large proprietors. It was also intended to demonstrate that sugar can be grown and made without any coloured

labour whatever. The experiment will be watched with much interest, not only by those immediately concerned, but by all interested in the progress of the colony.

GROWTH OF ARROWROOT.—Arrowroot has been grown and manufactured for years past, and could be more extensively cultivated if the demand for it were greater. Local requirements are soon satisfied, and outside markets have been too slow and precarious to lead to a large export trade. The total yield in 1886 was 463,876 lbs., and of this 211,636 lbs. were exported. The estimated value of the crop was £7,837. In this article again Queensland supplies much to and receives little from her neighbours.

INCREASE OF ACRES CULTIVATED SINCE 1860.—In order to show that the foregoing agricultural products are long since past the merely experimental stage, and that some of them have assumed considerable proportions in the industry and trade of the colony, the following particulars are given of the progress made since 1860 (which was the first year after separation from New South Wales) to 1886:—

Acres under crops of all kinds in 1886	209,561
" " " " 1860	3,353
	Increase, 206,208
Acres under wheat in 1886 ...	15,665
" " " 1860 ...	214
	Increase, 15,451
Acres under maize in 1886 ...	76,481
" " " 1860 ...	1,536
	Increase, 74,945
Acres under potatoes in 1886 ...	7,202
" " " 1860 ...	333
	Increase, 6,869
Acres under sugar-cane in 1886 ...	54,010
" " " " 1860 ...	<i>Nil</i>
	Increase, 54,010
Acres under grape vines in 1886 ...	1,517
" " " 1860 ...	<i>Nil</i>
	Increase, 1,517
Acres under other crops in 1886 ...	54,671
" " " 1860 ..	1,256
	Increase, 53,415

GROSS YIELDS OF TEN YEARS.—The following gross quantities of produce of various kinds have been obtained in ten years, from 1877 to 1886 :—

Wheat	982,647 bushels.
Oats	19,010 „
Barley	163,907 „
Maize	14,674,510 „
Rice	24,876 „ (in 1 year.)
Potatoes	151,314 tons
Cotton	782,967 lbs.
Sugar	281,924 tons
Arrowroot	3,526,174 lbs.
Tobacco-leaf	5,550 cwt.
Hay	300,247 tons
Wine	997,766 gallons
Grapes (for table use) ...	7,059,510 lbs.
Bananas	8,390,382 dozen
Pine-apples	927,173 „
Oranges	2,535,836 „

ESTIMATED VALUE OF CROPS TO GROWERS.—The above are summarised from official Government returns. A moderate estimate of their value to the growers is as follows :—

	£
The whole of the grain crops ...	2,776,366
„ potatoes ...	529,599
„ sugar ...	5,638,480
„ hay ...	900,741
„ fruit ...	319,820
„ cotton,* tobacco, } arrowroot, wine, } &c. ...	287,628
	<hr/>
	£10,452,634

AGRICULTURE IN THE UNITED STATES.—These figures are given more with the intention of showing what can be done than with a desire to parade what has been done. During the same period the results might have been ten times greater had the willing workers on the soil been forthcoming in greater numbers. It is chiefly owing to

* Exclusive of Government Bonus.

this that the agriculture of the United States has reached such gigantic proportions. The soil is no better, the products are not so varied and, as we shall presently show, the market prices are not near so good, and yet in the United States there are about five million men owning farms, and in 1886 the United States produced 974 bushels of maize and 21,074 bushels of wheat for every one bushel produced in Queensland; and other crops in similar proportion.

USE OF MAIZE AND HAY.—USE OF HORSES.—CONSUMPTION OF PRODUCTS.—It will be noticed that a very large proportion of the farming produce of Queensland is such as is not intended for human food, but as feed for horses. This is the principal use to which maize is put, although there can be made from it a meal suitable for several forms of most wholesome and agreeable diet. In addition to the 1,709,673 bushels of maize grown in 1886, there were 29,149 acres of land planted with lucerne, a favourite article of consumption for cattle, horses, and sheep. The reasons for this large production of animal aliments are not far to seek. As yet Queensland is a land of live stock rather than a land of men, women, and children; the former number millions, the latter only a few thousands. Notwithstanding the rapid extension of the Government railways, there is a large amount of the transit of goods in the interior that has to be done by horse and bullock teams. Carriers, especially in bad seasons and in the far interior, have to provide feed for their teams, and in this way large quantities of maize and hay are consumed. There are also far more horses used in the towns, and by settlers in the bush, than is the case in more thickly populated countries; saddle horses being more easily procured, and the disposition to take things easy so far as pedestrian exercise is concerned, being very general. Many squatters are also now raising maize, green feed and hay for their flocks and herds. It is found to be profitable to turn sheep into a paddock of lucerne for fattening purposes before sending them to market. Owners of live stock have found that it is not wise to depend wholly on the natural grasses of the country for feed for their flocks and herds. There are bad seasons ever and anon, for which it is prudent to make some provision in the "fat"

years. Maize and the various kinds of hay are grown chiefly for home consumption. The same may be said of wheat, as all the flour is absorbed by local demand, but supplies as yet only a small proportion of the amount consumed. The sugar annually produced is partly consumed in the colony, and the remainder, as has been shown, finds a ready sale in the markets of the other colonies. Sugar is being extensively cultivated on the rich soils on the banks of the northern rivers, but with this exception the agriculture of the colony is chiefly confined to its south-east corner. Brisbane is the centre to which the great bulk of the agricultural and horticultural produce is sent, and from thence, after local demands are satisfied, it is forwarded by merchants and agents to the central and northern parts of the colony.

GOOD DEMAND AND PROFITABLE SALE.—WHOLESALE PRICES OF PRODUCE, &c.—RETAIL PRICES OF TABLE REQUISITES.—On the whole there is a steady and reliable demand for farm and garden produce, the prices sometimes being in favour of the seller, in bad seasons, and at other times, in good seasons, in favour of the buyer. Influenced by the seasons, prices vary considerably, and we shall quote neither the exceptionally high nor the abnormally low, but the following quotations may be taken as a fair average of Brisbane prices:—

	£	s.	d.		£	s.	d.
Maize...	0	3	3	to	0	4	6 per bshl.
Potatoes	3	10	0	„	5	0	0 per ton.
Oaten Hay	3	10	0	„	6	0	0 „
Lucerne Hay	2	10	0	„	5	10	0 „
Sugar (White)	16	0	0	„	25	0	0 „

This last item has declined fully £10 per ton in value during the last three or four years, owing to the production in other lands of beet-root sugar, and the bounty which has fostered its production in some European countries. But this is an artificial competition which already shows signs of failure, and Queensland sugars are now rising gradually again in price. For beauty of manufacture and appearance, and for sweetening purposes, they cannot be excelled, and much lower prices than were

originally paid will amply remunerate the makers. The average retail prices of the chief table necessities in Brisbane in 1886 were—

Beef ...	0s. 3d.	to	0s. 5d.	per pound.
Mutton	0s. 3d.	,,	0s. 5d.	,,
Bread ...	...	,,	0s. 2d.	,,
Flour ...	...	,,	0s. 2d.	,,
Tea ...	1s. 9d.	,,	2s. 6d.	,,
Sugar ...	0s. 2d.	,,	0s. 4d.	,,
Butter ...	1s. 9d.	,,	2s. 6d.	,,
Potatoes	0s. 0 $\frac{3}{4}$ d.	,,	0s. 1d.	,,
Sweet do.	...	,,	0s. 0 $\frac{1}{2}$ d.	,,
Rice ...	0s. 3d.	,,	0s. 4d.	,,
Arrowroot	0s. 4d.	,,	0s. 6d.	,,

Coals are 16s. to 20s. per ton, and firewood from 5s. to 7s. per load, but with the exception of those living in the centre of towns there is no need to purchase fuel; the residents in the suburbs and country can obtain all they need from the surrounding bush.

SPECIAL COMPARISON OF YIELDS WITH UNITED STATES.

—The United States have long been the successful rivals of the Australasian colonies for the emigrating population of Europe. There have been several reasons for this; one has been the nearness of America as compared with Australia. But many farmers have preferred the States because of their supposed superiority in the yields of and markets for agricultural produce. This supposition is only partly correct as to average yields, and it is completely wrong as to average prices obtained in Queensland at least. We wish to bring this prominently into view, and so proceed to a comparison of these two countries. The figures are from official returns, omitting only small decimals.

Wheat averages in the	United States	12 bushels per acre
„ „ „	Queensland	9 $\frac{1}{2}$ „
Maize „ „ „	United States	24 „
„ „ „	Queensland	26 „
Oats „ „ „	United States	27 „
„ „ „	Queensland	12 $\frac{1}{2}$ „
Barley „ „ „	United States	22 „
„ „ „	Queensland	19 $\frac{2}{3}$ „

Potatoes average in the United States	79 $\frac{3}{4}$	busl. per acre
" " " Queensland	108	" "
Tobacco " " United States	737	lbs. per acre
" " " Queensland	1,008	" "
Cotton " " United States	180	" "
" " " Queensland	210	" "

The above are the principal crops of the United States, and amongst them it will be seen that cane sugar has no place. In America's own chief crops Queensland shows a better record of average yields in cotton, tobacco, potatoes, and maize; a slightly inferior position in wheat and barley, and only a very inferior position with regard to oats. This last is a crop which has had very little attention in Queensland for the grain, and one, no doubt, in which she will never equal countries in more moist and temperate climes.

AVERAGE PRICES IN QUEENSLAND AND UNITED STATES
—DIFFERENCE BETWEEN THE STATES AND QUEENSLAND.—
WASTED RESOURCES.—The contrast between Queensland and the United States is very striking when the average prices obtainable in the two countries are considered.

The average value of wheat—

In the United States is 3s. 6d. per bushel

" Queensland ... 4s. to 4s. 6d. "

Maize in the United States, 1s. 8d. "

" Queensland, 2s. 6d. to 3s. 6d. "

Oats in the United States, 1s. 5d. "

" Queensland, 2s. 8d. to 3s. 3d. "

Barley in the United States, 2s. 6d. "

" Queensland, 2s. 9d. to 3s. 3d. "

Potatoes in the United States, 2s. 2d. "

" Queensland £3 10s. to £4 per ton

Tobacco leaf in the United States, 4 $\frac{1}{2}$ d. per lb..

" Queensland, 6d. to 1s. per lb.

These figures should effectually dispose of the supposed superior attractions of the States to the man who purposes getting his living out of the soil, more especially when it is known beyond doubt that there are hundreds of thousands of acres of land in Queensland capable of growing any of these things—acres which hitherto are roamed over only by sheep or cattle. Queensland has a

greater variety of products than the States and a climate incomparably better than many of them. But the difference between the two countries is caused by the fact that the States have the essential element of wealth and prosperity, millions of independent and industrious agriculturists settled on the land; Queensland has not. And until these are forthcoming the broad plains will wave with no golden harvests, the bark of the dingo will only be heard where the ploughman should whistle at his toil, the kangaroo will bound through wasting herbage, and Queensland will not be doing her part in employing, feeding, and clothing the millions which her resources could amply supply.

NO EJECTMENT OR GAME LAWS.—The reader should be able to form some idea from the contents of this chapter as to what can be grown in Queensland, and the prices that can be obtained for farm and garden produce. He must judge for himself whether farming will pay; the figures go to show that if it will pay anywhere it will pay in Queensland. A man of diligent industry can grow nearly everything that he needs of life's necessities, and many of its edible delicacies, on a Queensland farm. That is a great thing to begin with apart from money and markets and gain. In good seasons there is abundance of everything—the very abundance causes embarrassment to the grower; he has more than he can consume or dispose of. It is at such times that prudence, method and science should preserve and lay up in store, counteracting greatly the evil effects of over supply, unprofitable markets, and bad seasons that may be in store. There is no ejectment because of improvements; the more a man improves his property the safer it is to him and the better for himself. There are no vexatious agrarian laws; the fish in the stream, the birds in the bush, and whatever game there is may fall to the farmer's shot or wriggle on his hook or smoke with tempting odour on his table. And with such liberty and such scope for industry, with the chief wants of life provided for within his own farm and garden, with groceries, clothing, and boots as cheap as they are in England, a little money will go a long way, and a man may live a long, contented, and enjoyable life. Many farmers have made money and acquired valuable properties apart from their farms, and what has been done may be done again.

But it should be sufficient assurance and attraction to many who have no such prospect when they know that in Queensland a man can soon acquire a comfortable home as a Queensland farmer.

CHAPTER IV. LAND LAWS.

RECENT LAND LEGISLATION.—A history of past legislation on the occupation and alienation of Crown Lands need not be given. In most countries the tenure of land is a subject of oft-recurring controversy as between the "haves" and "have nots." In the Australasian colonies it has been a subject of much debate and frequent legislation. The aim of legislation of late years has been to prevent the monopoly of the land by a few, in immense freehold blocks, and to promote either its alienation to or occupation by a large number of small holders.

In the usual and natural course of things the squatters were the first to settle on and make use of the lands of the colony.

PASTORAL INDUSTRY AT THE TIME OF SEPARATION.—PASTORAL REVENUE.—Attracted by the glowing reports of pioneer explorers, they found their way from the South with their flocks and herds and took possession of runs in the most favoured localities. Men who had previously been engaged in pastoral pursuits in the older settled districts of New South Wales migrated with their stock further north, and settled at their own pleasure on whatever block of pastoral country took their fancy. At the time when Queensland became an independent colony there were already some hundreds of runs in existence, on which were being depastured about half a million cattle and over three million sheep. This taking up of country was never regarded as constituting a claim of ownership. It was simply a permission to use Crown lands for grazing purposes until they should be required for closer settlement. All that the squatter paid was a small license fee of a few pounds per annum, and a small amount as assessment on his stock. How small the fees were may be judged from the fact that in the first year after separation from New South Wales, the

total area of leased runs in the colony was over 41,000,000 acres, and the rents received did not amount to quite £53,000—*i.e.*, not much more than a farthing per acre.

EARLY SETTLEMENT OF DARLING DOWNS.—It was at this time and in this manner that the magnificent stretch of country known as the Darling Downs was first taken up. Venturesome, enterprising men journeyed overland from the South, and one took this block and the other that of level, rich, and fertile land, the pick and pride of Queensland.

The irretrievable mischief was wrought not then, but some time after. At separation these downs became part of Queensland territory, and for some time after the granting of Responsible Government the squatters exercised preponderating political power. It was owing to this that the Darling Downs ultimately became divided into a few freehold estates, and are held as such to-day. This serious blunder the people of the colony have never ceased to regret and resent, but there appears to be no remedy for it now unless the Government or private capitalists purchase these Downs and dispose of them in small farms, on easy terms, to agricultural farmers.

DARLING DOWNS LOST TO AGRICULTURE. — The Darling Downs are only a small portion of the lands of the colony, but they possess so many and so great advantages that their loss to close settlement, even if it be only for a time, is a matter for deep regret. They contain some of the finest alluvial plains in the world, with rich black soil to an indefinite depth, with no timber needing to be cleared away before the implements of agriculture can be used; they are fairly well watered and have a climate better even than the climate generally, owing to their considerable elevation above sea level. Add to all these things the fact that they are within reasonable distance of Brisbane, as the market of agricultural produce, and that costly Government railways now traverse these downs for hundreds of miles in different directions. These railways run, for the most part, through large freehold pastoral estates, and neither the land nor the railways are doing what they are capable of—they are not devoted to the work and service of close, thriving, agricultural settlement.

LAND ACT OF 1884.—It was the knowledge of this, and the fact that the best agricultural lands in other parts of the colony were being alienated in big blocks for merely speculative purposes, that led to the passing of the new Land Act of 1884 by the newly-elected Assembly. That Act is now the law of the land, with some subsequent modifications and additions. The central idea of that Act was the prevention of reckless alienation of land by every means and the promotion of closer settlement by means of long leases for grazing farms, on easy terms, to *bonâ fide* settlers. Land speculation and monopoly it was desired to discountenance.

INCREASE OF PASTORAL RENTS. — PURPOSES FOR WHICH CROWN LANDS ARE AVAILABLE.—It was also generally felt, and admitted by many pastoral tenants themselves, that the lands apportioned to grazing purposes were not being made the best of, and that the runs should be made smaller. The rental that was being paid was, in many cases, ridiculously low, in view of the many advantages of police protection, postal and telegraphic communication, and, greatest of all, railway communication with all its comfort and convenience of locomotion and transit of goods to and from the squatters' runs. Considering all the advantages resulting from the expenditure of revenue and loan money, the time had come when squatters, in common with others, must bear their share of the general burden. "*The Land Act of 1884*" was meant, amongst other things, to result in more population, more cultivation, more pastoral tenants, and, ultimately, more land revenue. Stated broadly there are three ways in which Crown lands are now available—namely, for pastoral runs, for grazing farms, and for agricultural farms, and we will proceed to give some information under each of these heads.

THE PASTORAL INDUSTRY.

The territory of Queensland is devoted chiefly to pastoral occupation, and probably will continue to be so for many years to come. For this it has unrivalled resources, and must soon surpass its sister colonies in the number of its sheep, cattle, and horses. Its magnificent downs and its open forest country are capable of carrying

millions more than now graze upon them. The conservation of water will supply what has hitherto been a serious want, and this matter is receiving some measure of the practical attention which its importance demands.

CARRYING CAPACITY OF PASTORAL COUNTRY.—There is no reason to doubt the general equality of Queensland to the older wool-producing colonies of Australasia in the matter of stock-carrying capacity, and if such be the case, its possibilities of expansion in this source of wealth are vastly superior to theirs, according to recent stock returns.

Queensland has equal to 44 acres for each sheep

New South Wales	„	5	„	„
Victoria	„	5	„	„
New Zealand	„	4	„	„
Tasmania	„	10½	„	„

And yet, as showing what can be done, New South Wales has over four times as many sheep and only about one-third as much territory; and New Zealand has nearly twice as many sheep, and only about one-eighth part as much territory as Queensland. In this, as in other things, the chief glory of Queensland is not in what has been done so much as in what may be done. Queensland's vastness and richness are the emigrant's open doors of opportunity and possibility.

SCHEDULED AND UNSETTLED DISTRICTS.—“*The Land Act of 1884*” dealt, amongst other things, with the tenure and area of runs in the scheduled districts, which contain about 232,000,000 acres, and power is given in present Act to extend its operations over the whole colony, leaving what are known as the unsettled districts to be still dealt with under the terms and conditions of pre-existing Acts. The scheduled districts are situated along the eastern and northern seaboard, and the outside districts comprise the western portions of the colony. As a matter of fact there are no totally unsettled districts, sheep and cattle stations being now established in all parts of Queensland. In a legal sense, however, the distinction exists, and the difference between the two classes of districts is well defined in the matters of rent, conditions, tenure, etc.

PASTORAL TENANCY IN UNSETTLED DISTRICTS.—NUMBER OF RUNS IN 1860 AND 1886.—In the outside districts not affected by Schedule I. the pastoral tenants have conditional leases of their runs for a period of twenty-one years, at an annual rental averaging about 12s. 6d. per square mile. Their runs are liable to resumption by the Crown at any time, if required for close settlement, but such resumption can only take place on a vote of both Houses of Legislature. In 1860 there were 1,300 runs in the settled and unsettled districts, embracing an area of 41,027,200 acres; in 1886 there were 8,580 runs with an area of 302,260,240 acres. Of these there were 8,375 runs in the unsettled, and 205 runs in the settled districts, occupied at the end of 1886; the former covering $465,404\frac{1}{2}$ square miles, and the latter $6,877\frac{1}{8}$ square miles. The total rent of runs in the unsettled districts to December 31st, 1886, was £246,559 13s. 10d., and in the settled districts £13,632 11s. The total amount of Crown lands alienated up to the end of 1886 was 8,455,033 acres 1 rood 27 perches, and the total amount of purchase-money was £5,508,680 19s. 1d.

LITTLE LAND ACTUALLY ALIENATED.—CHANGED LAND POLICY OF NEW SOUTH WALES.—Compared with the territory of the colony a mere trifle of the land has been alienated. There has not been the reckless parting with the public estate for the sake of revenue which has obtained in New South Wales. That colony, in the four years from 1875 to 1878, derived £5,609,023 of revenue from auction sales of land alone; that is considerably more than Queensland has obtained from all sources of land alienation in twenty-eight years. So serious had this question become that New South Wales has had to adopt a totally different policy. The principle that has been introduced into the land legislation of New South Wales—when it was almost too late—has been introduced into the land laws of Queensland before such serious injury had been done: the principle that revenue should be derived not from the sale of but from the rents of public lands.

OPTIONAL CONDITIONS OF ACT OF 1884.—GOVERNMENT RUNS NOT PURCHASABLE.—“*The Land Act of 1884*,” as applied to the pastoral tenants in the settled districts,

or rather those whose runs are within the limits of a certain mapped schedule, leaves it optional for them to come under its provisions or not, as they think fit, but the advantages are so substantial under the new Act that it is being generally taken advantage of by the occupiers of grazing stations. One-half, one-third, or one-quarter of each consolidated run is being, as rapidly as can be carried into effect, resumed when required, but the tenant obtains fixity of tenure of the remainder for fifteen years or twenty-one years if his run is situated in the unsettled districts and for ten years if in the settled districts. He has the option of obtaining the use of the resumed portion of his run until it is actually required for other purposes, and he is entitled to compensation for improvements at the end of his time of lease should his run then pass to another tenant. The purchase of large blocks of country from the Government for pastoral purposes is now impossible.

Nothing but failure and disaster were predicted from the passing of this measure by its opponents*, but already the lessees are bringing their runs under its provisions in large numbers. If under it they hold less country than before they hold it by a far better tenure. While the much-abused right of pre-emption has been abolished there has been substituted indefeasible leases for long terms, and compensation for improvements, and while rents have been increased they are still very low, and these leasehold properties are constantly being improved by Government railways passing through them or drawing nearer to them.

RENT AND AREA OF RUNS.—ARTIFICIAL APPLIANCES AND IMPROVEMENTS ON RUNS.—The squatters now pay from $\frac{3}{4}$ d. to $1\frac{1}{2}$ d. per acre for their runs in annual rental. The runs are not larger than 100 square miles each, but several of them may be taken up by one lessee as a consolidated run, and so it sometimes happens that one squatter holds several hundreds or even thousands of square miles of pastoral country. These runs need not be fenced in; instead of this, generally, stockmen and shepherds are

* In 1887 759,344 acres were selected under the new Act for *bond-fide* settlement as agricultural or grazing farms. This is the largest quantity ever selected in any one year of the Colony's history, with the exception of 1882, when the selections taken up amounted to 845,018 acres.

employed in sufficient numbers to dispense with the need for fencing. Squatting in Queensland is on the whole a pleasant and profitable calling. The difficulties are no greater and not so varied as those which beset the pioneer pastoralists, and they in very many cases attained to wealth and honour. Seasons of drought come ever and anon, causing great destruction of stock, but the powers of recuperation and reproduction are wonderful with the return of good seasons. With the ever-increasing number of wells and dams which are being constructed by the Government and by private individuals, and also the more general and systematic cultivation of artificial grasses for green feed and hay, the droughts of the future will be in part provided against, and their destruction will be reduced to much smaller dimensions.

LIVE STOCK STATIONS.—POSSIBLE PREMIER POSITION.—The trunk lines of the colony running inland from the coast afford the means of conveyance from many squatting stations, for wool, skins, hides, &c., and these important items of export are forwarded regularly and quickly to their European markets chiefly by means of the grand steamers of the British-India Company. The total number of cattle in Queensland in 1886 was 4,071,563; horses, 278,694; sheep, 9,690,445; pigs, 61,861. The quantity of wool exported during the same year was 28,700,546 lbs., valued at £1,413,908. In the number of cattle Queensland stands first amongst the Australasian Colonies, having three times as many as either New South Wales or Victoria; and in the number of sheep it ranks fourth, and will probably soon surpass both Victoria and New Zealand, and ultimately New South Wales also. There is nothing Utopian in this supposition, the rapid increase already seen, the thorough and complete adaptation of Queensland to pastoral pursuits, and its much greater extent of available grazing land, justify the hope of Queensland attaining to the highest and leading position as a pastoral country in a few years.

The salubrity of climate, comparative freedom from disease, amplitude of territory, abundance of natural grasses, ever-increasing facilities of transit, excellence of wool, and conditions of pastoral tenancy, are some of the attractions that Queensland offers to the pastoralist.

EXPANSION OF GRAZING INDUSTRY.—The early coming years will bring about great changes in Queensland as a stock-raising country. Squatters will increase, graziers will multiply. The number of runs doubled in twelve years from 1875 to 1886.

Squatting is a pursuit which requires capital, and no country offers greater inducements to the capitalist, in this line, than does Queensland.

GRAZING FARMS.

Provision has been made for those who wish to settle on the land, but who have no desire to engage in agriculture, and not sufficient means to engage in pastoral pursuits on the extensive scale implied in being a squatter and taking up a run.

AREA AND RENTAL OF GRAZING FARMS.—In the belief that there were many of this class who wished to engage in stock-raising, and in the conviction that it was not necessary for a man to hold scores or hundreds of square miles of country who wished to engage profitably in breeding sheep and cattle, the Queensland Legislature has made provision for grazing farms. Many of the resumed portions of runs, under the Act, will not be required for agriculture for many years, but they can be used for grazing under the new system, in much smaller areas, as grazing farms. These farms will be from 2,560 up to 20,000 acres. They cannot be purchased, but they are leased for the long term of thirty years, at not less than $\frac{3}{4}$ d. per acre annual rental. There must be personal residence, or residence by bailiff on the selection, and within three years of the license being issued the selection must be fenced in.

The rental will be liable to increase after the first ten years, and at subsequent periods of five years, but the limits of increase are clearly stated and cannot be exceeded, so that there will be no element of uncertainty in the selector's calculations on that point. The inducements and facilities afforded under these provisions are many and great, and are such as to leave the man of small means nearly the whole of his capital to work on. The rental of a 20,000-acre grazing farm, at 1d. per acre, would only

amount to £83 6s. 8d. per annum. These farms will be equal in every way to the runs of which they have previously formed a part. No influence of any kind is allowed to be brought to bear upon the Land Court; the runs are as fairly divided as possible, and all matters of dispute are openly discussed and publicly decided by the Land Board, which is not subject to political influence.

GOOD AND ACCESSIBLE COUNTRY SECURED FOR GRAZING FARMS.—The lands are thrown open to selection as grazing farms after careful inspection by qualified and independent Government officials. Neither are these lands in out-of-the-way regions, but they are within accessible distance of some port or railway station. Roads and railways are constantly being constructed or improved in every part of the colony. These have made many a rough place of the olden days plain and smooth, and will practically bring the grazing farmer, whose selection may be two or three hundred miles away in the interior, nearer some town or port than was the squatter of forty years ago, whose run was only eighty or a hundred miles away from "Brisbane town."

To the end of 1886 the accepted applications for grazing farms under the Act of 1884 amounted to 242,140 acres. Seeing that much of this area was selected for this purpose during or shortly after one of the most disastrous droughts that the colony has ever known, it augurs well for the pronounced success of this novel mode of settlement now that the colony is experiencing the benefits of a return of good seasons and prosperous times.

ADAPTATION TO INCREASED WOOL-GROWING.—There is nothing local or limited in the grazing capacity of these Crown lands. Some localities are better than others owing to better soil, better grasses, better water supply or better roads, but from the extreme south to the extreme north and from the sea-coast on the east to the western boundary squatting runs exist, and where they are grazing farms may exist also. Wool is a commodity of world-wide demand, with ready sale at all times, sometimes resulting in such profitable returns that the struggling squatter or grazier is lifted in one or two seasons out of debt and difficulty into a position of ease and comfort.

AGRICULTURAL FARMS.

DIFFERENT MODES OF SECURING AGRICULTURAL FARMS.—Agricultural farming in Queensland, as we have already shown, is probably as remunerative as it is in most countries; so far as average yields and average prices are concerned it is superior to many countries in which agriculture is the chief support of the people. But all this might result in no substantial benefit if the cost of buying or of renting farming properties were excessively high. Here again, however, Queensland offers inducements which are not surpassed if they are equalled anywhere. All reasonable theories of land tenure, and the utmost possible assistance to its acquisition by selectors, are embodied in the Land Acts of Queensland. The selector can buy a farm on deferred payments, or he can lease one for the long term of fifty years and never buy it at all, or he can lease it for a while and then when it suits him to do so he can purchase it at any time during the currency of his lease. We cannot do better than insert here copy of a document recently issued from the Lands Office by the present Minister for Lands. The paper deals with this subject, and also with grazing farms and land orders, on both of which we have dwelt already, but the importance and interest attached to these subjects will justify the giving in full at this stage the contents of the official notice. It is entitled "Land Selection in Queensland," and is as follows :—

LAND SELECTION IN QUEENSLAND.

The conditions under which country lands may be acquired for settlement are substantially as follows :—

GRAZING FARMS.—Surveyed Areas of land, being the resumed portions of "Runs" (large areas leased to Crown tenants for long periods), are proclaimed open for selection over a great extent of Queensland territory, within accessible distance of the eastern seaboard on leases for a term of thirty years, in which intending settlers can obtain grazing farms of any area up to 20,000 acres, at their option, at a minimum rent of three-farthings an acre, the rent generally ranging from three-farthings to twopence. This rent is subject to re-assessment by the Land Board after the first ten years, and subsequently at intervals of

five years; but the rent cannot be increased at any re-assessment to more than 50 per cent. above that for the period immediately preceding. The land must be continuously occupied either by the lessee or by his agent or bailiff, and must be fenced in within three years from the date of selection. These grazing farms cannot be made freehold, but the leasehold may be sold, subdivided, or mortgaged, or, with the consent of the Land Board, sublet.

AGRICULTURAL FARMS.—The freehold of Agricultural Farms may be secured on terms which it is believed are more liberal than those obtaining in any other British colony, under the following conditions:—

The best lands on lines of railway, near centres of population and on navigable waters, are set apart and surveyed as farms, with the necessary roads and reserves, the area of the farms being from 20 to 1,280 acres. A transferable lease of the farm, with right of purchase, is issued for a term of fifty years, at an annual rent varying from threepence per acre to higher rates, seldom exceeding one shilling, according to the quality and situation of the land, its natural supply of water, &c. The selector (who must be eighteen years of age at the time of selection) must occupy the farm continuously either by himself or his bailiff or agent, and must, within five years, fence in the land, or expend an equivalent sum in other substantial improvements. The rent is subject to periodical re-assessment, as in the case of grazing farms.

ACQUISITION OF FREEHOLD.—The freehold of these farms may be acquired at a price fixed when the land is thrown open for selection, and being not less than twenty shillings per acre, generally ranging from twenty to twenty-five or thirty shillings.

In order to secure the freehold there must be ten years' personal and continuous *bonâ fide* residence by the lessee or two or more successive lessees, but any lessee may transfer to any other person who is qualified to be a selector.

In effect, these farms are sold to *bonâ fide* selectors on credit, the rent amounting to something like $2\frac{1}{2}$ per cent. on the purchasing price, all rent paid during the period of personal residence being counted as part-payment of the purchase money.

The purchase of the freehold may be made at any period of the lease after ten years' continuous residence, but

if not made within the first twelve years the price is subject to increase in proportion to the increase of rent (if any).

FIFTY YEARS' LEASE.—If the lessee is indisposed to purchase he may continue to hold the land on lease for the whole period of fifty years, the condition of occupation being performed by the residence either of the lessee or his bailiff or agent.

SMALL FARM FREEHOLDS AT TWO SHILLINGS AND SIXPENCE AN ACRE.—Small farm freeholds or homesteads may be secured in five years in areas not exceeding 160 acres, or smaller areas if desired, at two shillings and sixpence an acre on a system of deferred payments, extending over the period of five years, at the rate of sixpence per acre per annum.

CONDITIONS TO SECURE FREEHOLD OF HOMESTEADS.—The selector must reside personally on the land during the five years, and must make improvements on it before the end of the five years of a total value equal to not less than ten shillings an acre. Thus, on a farm of 160 acres there must be work done in fencing, clearing, building, or otherwise, of not less than the total value of £80, by the end of the five years; or, on an 80-acre farm, £40; on a 40-acre farm, £20, &c.

When such work is done by the farmer himself there will thus be no actual outlay of money. On the performance of these conditions the selector may claim a grant of the land on payment of the deed fee, amounting on a farm of 160 acres to £1 10s. The survey-fee on such area, 160 acres, amounts to £7 7s. 6d.; this must also be paid, but may be paid in five equal annual instalments of £1 9s. 6d. each; the fees on smaller areas are proportionately less.

FREE GIFTS OF LAND: LAND ORDERS, £20.—Attention is specially directed to what amounts to a free gift of agricultural land in favour of persons of European extraction paying their own passages, or those of their families in full, to Queensland from Europe, the United States of America, or any British possession other than the Australasian Colonies. A wife, child, step-child, or grand-child is reckoned as one of the family. To persons thus paying their passages in full, land-orders are issued of the value of twenty pounds sterling (£20) for each person of twelve years and upwards, and of ten pounds (£10) for each child between twelve months and twelve years of

age. These land-orders are available to their full nominal value in payment of the rent of agricultural or grazing-farms held by the head of the family or the person in respect of whose passage the land-order is issued, and when used in agricultural areas they amount to a free gift of land, as follows:—

SINGLE LAND ORDER.—A single person, eighteen years of age, holding one land-order, value £20, may select in any agricultural area 160 acres of land. The annual rent of sixpence an acre required to be paid for five years to secure the freehold amounts to £20, and the £20 land-order, being available to its full nominal value for this purpose, suffices for the payment of the whole rent, and thus secures the fee-simple of the land as a free gift, excepting the amount of £8 17s. 6d. to be paid for the survey and deed fees.

The head of a family, say of eight persons, counting seven adults, including the father and mother, paying their passages in full would receive land-orders as follows:—

	£
Father	20
Mother	20
Two children of eighteen years or over	40
Two children of twelve years or over	40
Two children between twelve months and twelve years	20
	<hr/>
	£140

USE OF LAND ORDERS: RENT.—In such a case the head of the family could obtain either one land-order of the value of one hundred and forty pounds (£140), or separate land-orders, of an equal aggregate amount, in respect of each person. In either case the land-order or land-orders would be sufficient for the payment of the rent of a farm of 1,120 acres for a period of five years at sixpence* an acre a year.

The provisions of the Act relating to homesteads are intended to assist in the settlement of men of small means. If a selector desires to obtain a larger area than 160 acres,

* Agricultural land may be obtained at threepence an acre, but for tillage-farms, the better lands at about sixpence an acre are much to be preferred.

he must take up the remainder at some place not adjoining the homestead, and must perform the conditions of occupation of the other farm or farms by an agent or bailiff.

SEPARATE HOMESTEADS.—In families where there are children of the age of eighteen years or over, a separate farm of 160 acres may be taken up by each such person, so that each may secure the freehold at the end of five years, as already described; but it must be remembered that the *bonâ fide* personal residence of the selector (*i.e.*, in the case supposed, the child) is required for five years on each separate homestead, as well as an expenditure at the rate of ten shillings per acre within that period.

LAND ORDERS PAY RENT OF GRAZING FARMS.—Land-orders are also available to their full nominal value in payment of the rent of grazing farms.

For instance, the rent of a grazing farm of 2,560 acres at twopence (2d.)* an acre being £21 6s. 8d., the land-order given for a family counting as seven adults would pay the rent for more than six years and a-half.

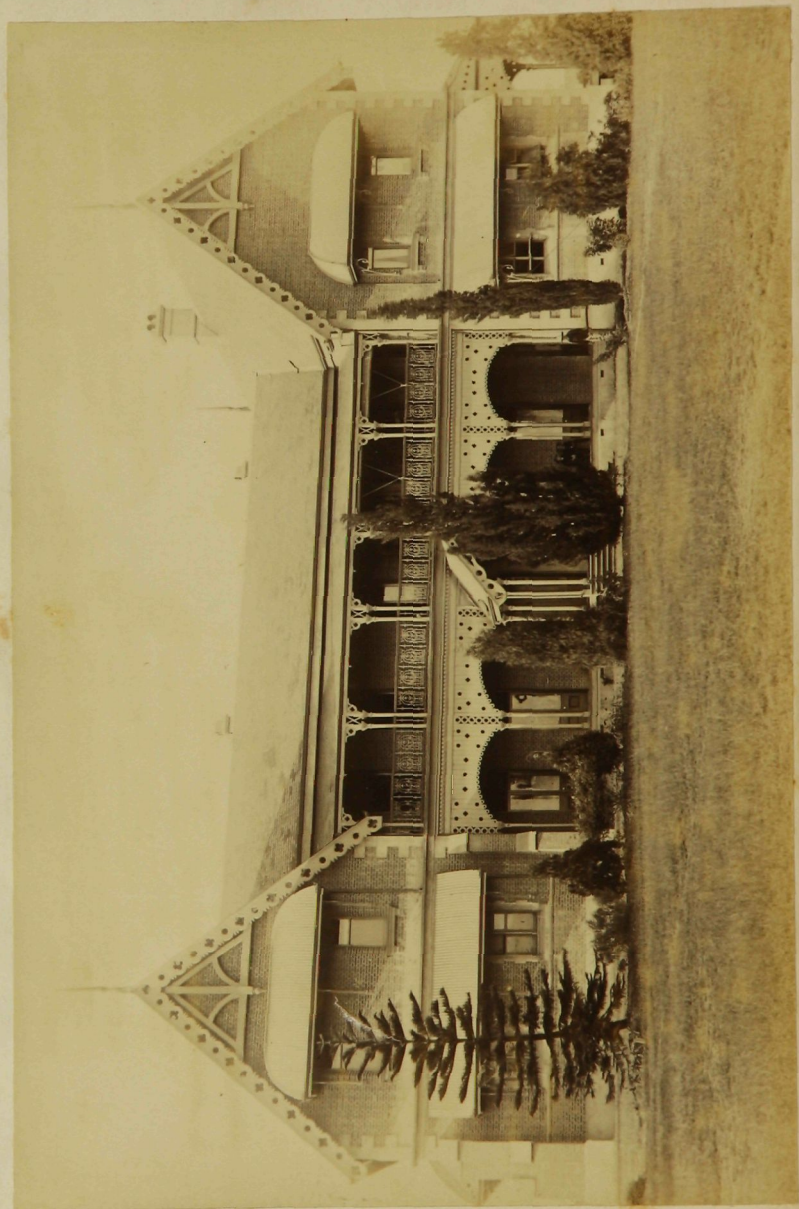
APPLICATION FOR LAND ORDERS.—Persons intending to proceed from Great Britain to Queensland, and to pay their own passages in full, are advised to make application to the Agent-General for the Colony, No. 1, Westminster Chambers, Victoria street, London, S.W., for land-orders, but it should be remembered that these are not transferable, and can be of no use to anyone who does not settle on the land and fulfil the conditions as above described.

Full-paying passengers from the United States of America, any European State, or any British possession can obtain the land-orders in the Colony. All persons holding land-orders are desired, on arrival at the principal port (Brisbane), to apply at once to the Department of Agriculture, which is under the control of the Minister for Lands; or, if they arrive at any other Queensland port, to the Immigration Officer or Land-Agent, from whom they can obtain all necessary information to assist them in the selection of land.

VILLAGE SETTLEMENT.—Special provision is made for the settlement of little communities, so that the settlers may live together, for mutual protection and convenience,

* The rents may exceed this in some cases, and is often less.





GRAMMAR SCHOOL, MARYBOROUGH.

in townships on freehold town allotments, with farms of eighty acres contiguous or in close proximity to their residences.

Land of the best description is now being surveyed in the most suitable localities for carrying out this village settlement, and land-orders are available for taking up and paying for the land in these townships. This scheme, it is believed, will be specially attractive to persons paying their own passages in full, and coming to Queensland from Europe and the United States of America.

FREEHOLDS—ANNUAL PAYMENTS OF SIXPENCE AN ACRE SECURE FREEHOLDS—IMPROVEMENTS—TOWNSHIP ALLOTMENTS ONE ACRE.—In these agricultural townships the payments on account of rent are the same as on the homesteads before described—namely, five annual payments of sixpence an acre each, to secure the freehold; the conditions of continuous *bonâ fide* personal residence and of improvements being as before stated; but one-fifth part of the required improvements on the farms may be made on the town allotments, which contain an area of not more than one acre. The townships, not exceeding two square miles in area, will provide space for churches, schools, and other requirements suitable for small communities of people, so that mutual assistance and protection may be secured.

SELECTORS MUST BE BRITISH SUBJECTS.—It should be added that a selector, if an alien, must become a British subject by naturalisation (to which no obstacles are offered except in the case of Asiatics) before he can acquire the freehold of his farm.

STATE FREE SCHOOLS.—There is no State Church in Queensland, all denominations being placed on one common platform. State schools are established in almost every part of the colony where there are as many as thirty or forty children.

TRAINED TEACHERS—PRIMARY AND GRAMMAR SCHOOLS.—Well-trained male and female teachers are appointed by the State, and a good English education may be obtained in any of the State schools free of any charge. Grammar schools are liberally endowed by the Government, and scholarships are given annually, by competitive examination to pupils of the primary schools, entitling them to three years' free education in a grammar school.

Three exhibitions, tenable for three years, are also annually offered to students desirous of proceeding to any of the universities of Australasia and Great Britain.

The Queensland Parliament has recently authorised the establishment of a Department of Agriculture and the appointment of an Instructor in Agricultural Science.

HENRY JORDAN.

Department of Public Lands,
Brisbane, December, 1887.

Such, simplified and epitomised, are the terms and conditions under which land may be selected in Queensland. It is hardly possible to imagine conditions more easy than those embodied in the existing land laws, or to make them more easy to understand than they are as set forth in the above explanation. We may, however, illustrate the mode of procedure by suppositious cases. We will suppose that a man wishes to take up a selection as soon as he lands, or, better still, at some subsequent period. He decides to take up what is known as a homestead of the maximum area of 160 acres. At any of the principal ports or inland towns he will find a Land Office in charge of Government officials, who have strict instructions to give every information to applicants with regard to quality and locality of the land open to selection in their particular district. He is a man who wants to obtain a farm of good agricultural land, and also wants to make it his own freehold property as soon as possible. His wishes can be met and he can obtain a 160-acre block of first-class agricultural land at 2s. 6d. per acre. The total cost of such a farm would be £20, and the survey and deed fees £8 17s. 6d. But if he offers £28 17s. 6d. cash down in one payment, and demands his deeds, he will find that the officials will neither accept the one nor issue the other. The first object is to settle men and families on the land; it is not a question of money so much as men; the spirit and genius of the Land Act is not the stimulation of speculation, but the encouragement of close settlement on the productive lands of the colony. But in order to accomplish this it has always been found advisable to impose certain fair and reasonable conditions. That such conditions have sometimes been evaded was one reason for their being made more stringent in the latest measures of land legislation.

PERSONAL RESIDENCE AND IMPROVEMENTS.—The applicant must personally reside on his selection for a consecutive period of five years, and during that time must make improvements on the property to the value of ten shillings per acre. He may not be able to pay wages in making improvements, but the labour of his own hands is just as good in the eye of the law as the spending of current coin. So long as the improvements are made that is all that is required, and every swing of the axe, every blazing stump, every fallen tree, his own slab hut, the rough bush fence, the dam or well for water, the sty for the pig—all these are reckoned (with no grudging valuation) as part and parcel of the stipulated improvements, and he would be a sorry farmer and a most undesirable settler who could not succeed in making much more than £80 worth of improvements on a 160-acre farm in five years.

ACCRUING BENEFIT OF LABOUR ON HOMESTEAD.—For the consciousness that all this toil means money, all the labour is for his own and his family's benefit, stimulates him as he goes forth fresh to his toil in the morning, and cheers him when he returns home weary at night. Underlying all his labour there is the strong stimulus and constraining power of a self-interest which can be freely indulged without injury to anyone else; there is the knowledge that he is not hewing, sawing, splitting, fencing, planting for someone else. There is no galling sense of a desperate attempt to do impossibilities under a grinding rack-rent, with a probability of ejection as the end and reward of his toil. On Queensland soil, under Queensland skies, and by the helpful provisions of Queensland laws, he is making himself and those who are dependent upon him a home, which the labour of his hands is making brighter, better, and more valuable every day. But a homestead selection such as we have been speaking of is only one way in which an agricultural farm may be obtained. Should a selector wish for something bigger, the terms on which he can lease a farm extending to as much as 1,280 acres, are clearly stated in the pamphlet quoted above. The object of this system, of long lease with right of purchase, is to render every assistance to those who wish to engage in farming on a larger scale than

is possible on a homestead of 160 acres, but who do not wish to sink what little capital they have in purchasing from a private owner, or in immediate payment of purchase money to the Government.

It would be difficult to devise anything better calculated to meet these requirements, and at the same time avoid and prevent the monopoly of and speculation in the best agricultural lands of the colony. We will suppose a man to select an agricultural farm of the utmost extent that the law allows—1,280 acres. The rental at 6d. per acre (it may be 3d. or 4d.) would only amount to £32 per annum, and, subject to periodical re-assessment, he may, if he chooses, go on paying rent for the farm for the whole fifty years of his lease. Should he wish to make it a freehold the terms on which he can do so are clearly explained above. The law as it stands makes it possible for selectors to get on to their farms with the expenditure of very little money, leaving them whatever capital they have for the purchasing of tools, implements, household requisites, and a few head of stock. It gives the selector the opportunity of making the land pay for itself in what can be got out of it in a few industrious years.

UTILITY OF CONDITIONS.—The British reader may wonder at the imposition of any conditions and restrictions concerning the acquisition of land in a vast colony like Queensland, but a moment's reflection will be enough to lead to the conclusion that it is better to have land unoccupied than to have it monopolised. A young land like Queensland should profit from the experience of older nations, and even by the experience of older colonies. The Government Statistician of New South Wales in his recent work, "The Wealth and Progress of New South Wales," during the first hundred years of its history, dwells upon the fact that the alienation of land in that colony has not been accompanied by settlement in proportion:—

"It will be observed that the alienation of the public estate by means of auction sales and unconditional selections after auction attained its highest point during the years 1875 to 1878. . . . It was not until it became evident that this indiscriminate sale of the public estate was threatening to endanger the true interests of the country that this form of alienation was stopped. . . . The fact forced itself upon the attention of the authorities that this wholesale alienation of Crown lands was not due to the demand created by the normal progress of settlement,

but was the outcome of an unhealthy rivalry between the two principal classes of settlers—the pastoral tenants and the free selectors. Besides this, the estate of the country was being parted with without any conditions as to improvements or settlement, and as the great object of land sales was to aid settlement it was deemed advisable by the Government to temporarily suspend land sales by auction, and ultimately it was decided to sell only a limited area during any one year.”

The truth and wisdom of these reflections are amply sustained by the facts of the case. In March, 1887, the returns for New South Wales showed that 977,664 acres of land were under cultivation, which was not quite equal to one acre per head of the population. The total amount of land alienated in that colony at that time was 41,285,464 acres; that is, in plain words, forty-two times as much land had been alienated as was actually being made use of for agriculture. In Queensland the record was slightly better as to area under cultivation per head of population, but Queensland, though several times larger than that colony, had not alienated more than about one-fifth as much of its territory. New South Wales has already alienated nearly one-fourth of her territory, with a population of only about one million; Victoria has alienated about one-half her territory amongst about the same population. It is not to be wondered at that in colonies where there is such an evident disposition to monopolise the possible home of millions by a few thousands, immigration should have been discountenanced and discontinued.

LAND ALIENATION IN NEW ZEALAND.—New Zealand has alienated nearly one-third of its territory, and has only a population of about 600,000 Europeans. Queensland has parted with about one-fiftieth part of her territory by alienation, and popular sentiment is strongly opposed to the reckless prodigality of the course which has been followed by the older colonies of the group.

Land best suited for agricultural purposes is being set apart and made available for present and prospective requirements in every part of Queensland. Wherever in any district there is any considerable quantity of first-class agricultural land steps are being taken to prevent its being locked up in long leases for pastoral purposes; it must be so dealt with as to leave it readily available at any time when increased population shall require it for homesteads and agricultural farms.

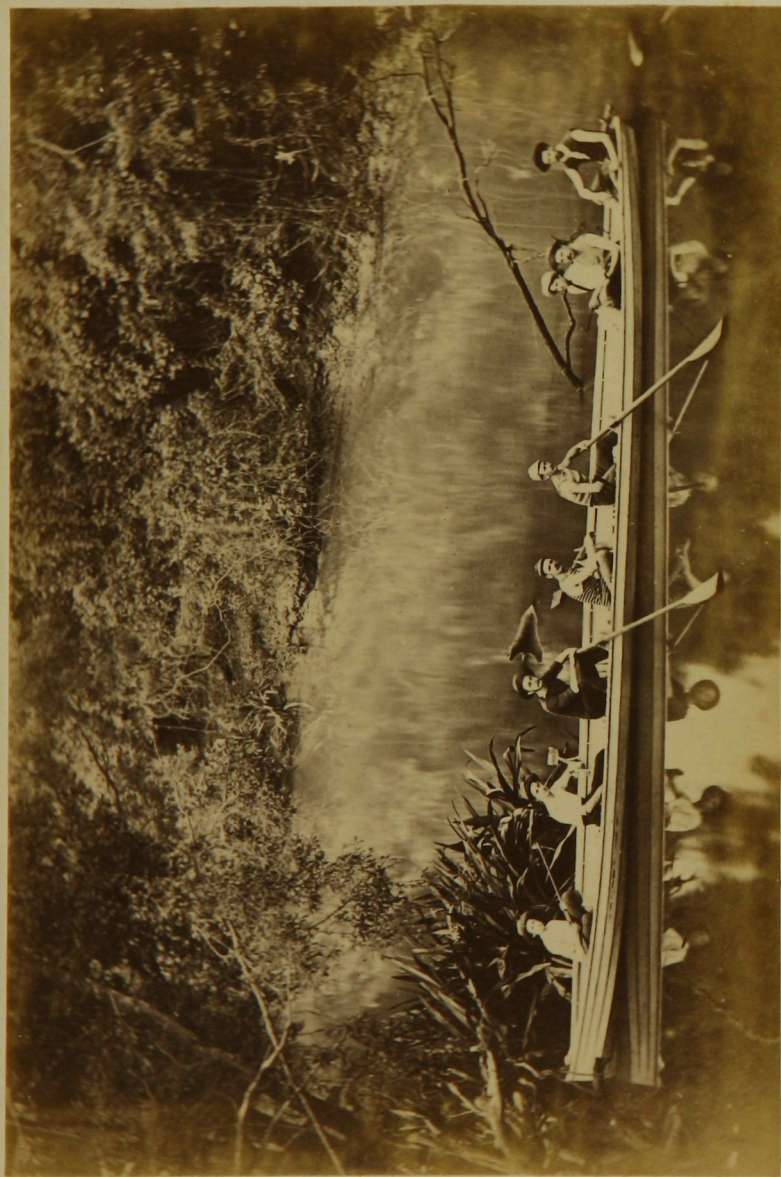
DISTANCE FROM PRESENT CENTRES OF POPULATION.—

In every locality the advantages of roads, railways, and watercourses will be as fully secured to farmers as possible. There are millions of acres of as rich land as any in the world available for immediate selection. No one denies their adaptation to the growth of cereals, sugar, tobacco, cotton, fruits—one or all, as the case may be. It is only objected that many of these rich agricultural lands are too far away from any existing markets. To this we can only reply that vast changes are accomplished in young countries in a short time. The resources of Australia will be required to meet an infinitely greater demand than has yet been made upon them. Look at Canada! look at the United States! Flourishing cities and communities of to-day had their origin in solitudes far more distant from any city or market than any place in Queensland is. Let the inhabitants of Queensland be multiplied and the earth will yield her increase; then artificial comforts will be in demand, artizans will be wanted, and markets for labour and markets for produce and markets for fabrics will be created and multiplied.

FREE GIFTS OF FARMS.—Let it be remembered that the Government, in some cases, offers the immigrant a good farm for nothing, and in other cases for next to nothing, and with a farm large enough and rich enough to grow nearly all that he wants, the selector may very well reconcile himself to comparative solitude for awhile, and to the absence of the commercial element, which really he can very easily do very well without.

CHAPTER V.**THE MINING INDUSTRIES.**

MINISTER FOR MINES.—THE CANOONA RUSH.—IN addition to its pastoral and agricultural resources Queensland possesses mineral wealth of every kind. A geological description would be foreign to the purpose of this work. A highly qualified Government Geologist has been at work for some years past examining the geological formations of the goldfields and other localities. There is a Department of Mines and recently an additional Cabinet Minister has



SCRUB SCENERY ON QUEENSLAND CREEK.

been created (Hon. W. O. Hodgkinson), who, as Minister for Mines, will have this department under his control. By these means, and by the granting of rewards for new discoveries, and in every practical way, the mining industries of the colony are encouraged. For some time before the discovery of Gympie—the oldest goldfield in Queensland—there was a general impression that gold would be found. The first “rush” was to Canoona, on the Fitzroy River, in 1858. Thousands went there, but few found the precious metal in sufficient quantities to pay wages for their labour; this was when Queensland formed a part of New South Wales.

DISCOVERY OF GYMPIE.—That rush did good service to the colony, notwithstanding that the immediate results were unsatisfactory. It originated the now flourishing town of Rockhampton, and introduced a number of practical diggers from other parts of Australia, some of whom prospected the country in different localities. Ten years after the Canoona rush a wandering digger named Nash discovered nuggets of the precious metal at Gympie. The usual rush, following this time upon the real discovery of payable gold, soon set in, and in a few weeks thousands of eager men were at work where unbroken bush solitude had reigned for ages. Soon after the discovery of alluvial gold, quartz reefs, the true matrix of gold, were found, and while on this goldfield alluvial digging has almost ceased, quartz reefing is an established industry which will be a source of work and wealth to thousands of miners and shareholders for very many years to come.

Since the discovery of Gympie many other alluvial and quartz diggings have been found, while there is still an immense area to be “prospected,” and every probability of the discovery of many more. The discoveries of the past were most welcome and in several instances most opportune, amounting in some cases to national blessings and deliverances. Discovered in times of depression and impending disaster, their effect on trade, property, wages, and all the relations of social life was magical.

CROYDON GOLD FIELD.—The latest discovery is at Croydon, away in the distant north-west interior of the colony. It is a region of rich and abundant reefs, and is likely to be the largest and best goldfield that has yet been

discovered in the colony. The following table will give some idea of the value of these various goldfields as means of employment and sources of enrichment to the community :—

Total Yield of Goldfields to end of 1886.

	Ounces of gold
Gympie	1,221,331
Cloncurry, Calliope, &c.	289,098
Rockhampton Fields	89,834
Palmer	1,265,191
Ravenswood	316,825
Charters Towers and Cape River	1,460,600
Hodgkinson and Mulgrave	215,653
Etheridge and Woolgar	320,543
Croydon	2,144
<hr/>	
Total	5,181,219

The above yield, at the moderate average of £3 10s. per oz., gives a grand total value of £18,134,266—an amount nearly equal to the present national debt of the colony. Gold is found dispersed in different localities all over the colony, and so well known are many of the mines for their richness and permanency that they have been purchased by English investors at very high prices. So regular are the crushings and so uniformly rich are the yields of some, that they furnish dividends every few weeks and give a return to the shareholders such as would never be dreamt of in any usual form of investment. The world-renowned Mount Morgan is the richest of Queensland's gold mines, and has been declared by competent authorities to contain many millions of pounds in value. The formation in which gold is found there is peculiar, and it is quite possible that it is only the first of the geological "blows" of the same formation that will yet be discovered.

GOLD YIELD OF THE COLONY.—LIFE OF DIGGERS.—CAUTION TO NEW ARRIVALS.—There can be no reasonable doubt that Queensland is destined to be the richest and most permanent gold-producing colony in Australasia. The aggregated yields from 1882 to 1886 were 1,397,419 ounces of gold, valued at £4,890,966. At the latest computation of which there is any official record—that is

at the end of 1886—there were in the colony 1,430 quartz reefs proved to be auriferous. Remembering the extent of the colony and its generally auriferous character, it will be seen how great are the probabilities of Queensland far surpassing all the other British possessions in the new discoveries and permanent values of her gold-fields. The independence and constant expectancy of something literally turning up make the search for gold irresistibly attractive to many. One grand feature of these goldfields is that they afford employment at good wages to thousands of practical miners, and are the chief support of many other trades and industries. They employed in 1886, 306 steam engines and ninety-five crushing machines. The life of a gold miner, while it is often rough and in some degree perilous, has many attractions even to the new comer. The newly arrived immigrant will do well, however, to invest none of his limited means or hard-earned savings in gold-mining shares. If he can obtain work in any capacity on a goldfield well and good; far better to be content with weekly wages and watch and wait for awhile than to risk all in a venture in a claim of which and of the owners of which he knows nothing. There are many blanks in the lottery, and there are those with whom share selling is a study and a fraud.

The auriferous ground of Queensland is practically unlimited, and the precious metal is found in geological formations in which it was not supposed to exist a few years ago.

OTHER KINDS OF MINING.

There are many mineral treasures in the colony which at present are almost untouched, owing to the greater attraction of gold, or because of the absence of local demand, and the cost of production and shipment to the markets of Europe.

There are immense stores of copper and tin, but the production of both these has fallen off considerably, and the quantities exported are far less than would have been the case but for the abnormally low prices ruling in the foreign markets for several years past. A revival of demand and a return of paying prices would result in a largely increased export trade from Queensland mines.

COPPER.

The principal discoveries of copper have been at Mount Perry, in the Burnett district; Peak Downs, in the South Kennedy district, distant about 250 miles from Rockhampton; and on the Cloncurry River, in the Burke district. Little is being done at any of these places, for one or another of the reasons stated above, although in each of these localities there are mines of great richness. At Cloncurry, especially, the richness of the ore is remarkable, containing as much as 50 per cent. of copper. At these mines heavy masses of pure copper are found, and in such abundance that, with the construction of a line to the nearest port, the ore could be sold at a figure which would considerably lower the market value of this metal.

There have been years in which 15,000 to 20,000 tons of ore have been raised, but in 1886 the quantity was only 900 tons, of the estimated value of £7,000. The total value of the copper raised in Queensland to the end of the same year was £1,638,956, but there is no doubt that as much could be raised in one year as has been raised in thirty if there were a sufficient demand for it at remunerative prices, and if the best facilities for transport were available. Mines that have been sunk hundreds of feet deep, and works that have cost tens of thousands of pounds, are now lying idle. The probabilities are that this and other sources of wealth will never be fully utilized by the demands of an export trade. They are Nature's provision for the time when millions of human beings with all their wants shall create markets and industries for their sale and use on the continent where they are found.

TIN.

This metal in its mineral state is found in different places widely scattered over the colony—at Stanthorpe in the south, and at Herberton, Cooktown, and other places in the north and north-west. Stanthorpe, so far, has yielded alluvial or stream tin only, but Herberton has large quantities of both alluvial and lode tin in its neighbourhood. Both these places had their origin as towns in the discovery of this metal; but owing to the

non-discovery of any payable lodes of tin at Stanthorpe, the industry has declined there. In 1881 the value of this export was £2,168,790, being nearly double the value of the wool, and considerably more than twice the value of the gold exported during that year. In 1886 the value of the tin produced was £162,124, and the total value, from its first discovery in 1872 to the end of 1886, was £4,721,561.

COAL.

The discovery of this non-metallic mineral dates back to the earliest days of exploration and settlement, and coal beds are now known to abound in every direction. Geological and practical investigations have proved the extent and quality of immense areas of coal, and the existence of many more is reasonably conjectured.

COAL DEPOSITS IMMEASURABLE.—Coal-mining is now a firmly-established and rapidly-growing industry, chiefly confined to the neighbourhood of Ipswich, where it was first discovered and worked, and to the Burrum Coal Fields, in the neighbourhood of Maryborough. It is an industry in its infancy, as yet; but growing rapidly every year. No reliable estimate can be made of the quantity of this mineral, and it is only safe to say that the deposits known to exist will meet the domestic and manufacturing requirements of millions of inhabitants for centuries. The supply may be considered practically boundless and inexhaustible, and as the years roll by the ever-increasing demand will afford employment to thousands. Queensland coal is used on the Government railways, on coasting and ocean-going steamers, in foundries and manufactories, and in the principal towns it is used for gas-making and domestic stoves.

Chemical analyses show that the coal from different districts and of different geological periods and formations is specially suitable for heating purposes, steam, coke, or gas, as the case may be.

COAL TRADE.—In the first year of Queensland's independent existence the total quantity of coal raised was 12,327 tons, of the value of £9,244; in 1886, the output was 218,206 tons; and the value £91,817. The total amount raised from Queensland mines was 1,451,960

tons; and the total value £677,634. The mines in operation in the latter year occupied between 400 and 500 men below and between 100 and 200 above ground. Compared even with New South Wales, this source of wealth has hardly been touched, and, of course, there is no comparison of the production and consumption of coal in Queensland with the production and consumption in England. The time may, however, come, and even now may be within measurable distance, when, in order to maintain her pre-eminence as a manufacturing nation, England will need to import coal with other raw products.

COAL TRADE OF NEW SOUTH WALES.—When the time comes that coal will be needed in and can profitably be carried to European centres of manufacture, Queensland will possess great advantages over her neighbours, her Northern coalfields and ports being much nearer the possible markets of future demand. Even now New South Wales ships coals to Victoria, South Australia, Tasmania, New Zealand, South Sea Islands, Hong Kong, China, Java, Manilla, Peru, United States, and many other countries. The quantity of coal shipped to countries trading with New South Wales in 1886 was 1,735,865 tons, and the value was £947,002. With the increase of population at home and the increase of foreign trade, these two colonies will make rapid advances in the coal industry and trade. Queensland having every facility now which New South Wales has, and being much nearer some of the markets for Australian coal, the latter colony will have in Queensland a formidable competitor in this important branch of industry and commerce. The present home consumption is little more than a tapping and testing of a rich and an abundant store.

Other metals and minerals, such as lead, silver, iron, bismuth, quicksilver, &c., are known to exist in considerable quantities, but we can do no more than allude to them. Time, capital, labour, and demand will be required for the development of these sources of wealth.

SILVER ORE.—In 1886, 2,000 tons of silver ore were exported, valued at £56,242. The Ravenswood Gold Field contains rich deposits of silver-bearing galena;



SUGAR PLANTATION.

and the other principal silver lodes, so far as known at present, are at the Herberton, the Star River, and the Sellheim River Silver Fields.

With a country so vast, and resources so varied and rich, plain and careful description may appear like interested exaggeration. But the plain and proved truth is that Queensland has not only immense surface area, with a capacity for producing suitable and abundant food for many millions of men and beasts, not only the pastoral and agricultural facilities for the supply of wool, cotton, leather, silk, &c., but in addition to these things there are underground supplies of mineral wealth sufficient to supply all the requirements of art, manufactures, currency, and every other requirement of civilised society to the millions of inhabitants who will one day be dependent upon these bounties for the supply of their wants, the materials of their craft, and the support of their trade and commerce. The mineral wealth of Queensland is not conjectural; it is proved, and it is immense. Hard-headed, hard-handed men are constantly going to and fro in the land, and these are the pioneers of discovery and settlement and new industries. In addition to these practical men the Government has taken care to secure the services of first-class scientific men in geology, botany, meteorology, and last, but not least, in agriculture; so that science and labour shall mutually aid and guide the toiler and explorer in his search for those things which play so important a part in civilised life, and which exist in every variety, in every direction, and in infinite abundance in Queensland.

CHAPTER VI.

OTHER INDUSTRIES AND OCCUPATIONS.

It will be necessary to glance at other industries and occupations in order to give a correct idea of Queensland as a market for labour and a country with many favourable openings for the investment of capital, in addition to its gold mines. It will be of interest to many contemplating emigration to know something more of the work and wages obtainable in this colony. The returns on which this information is given are based on the official statistics of 1886,

and may be regarded as being fairly reliable. Trade and wages have, if anything, improved since then and with the highly favourable seasons which are now being experienced there is every prospect of a return of general prosperity.

1. *Government Services.*

	No. of Persons.
Principal officers, heads of Government departments, &c.	88
Clerks, officers, accountants, &c.	647
Architects, civil engineers, surveyors, draftsmen	140
Subordinate officers such as sorters, lockers, &c.	299
Police and detectives	710
Officers at penal establishments	87
Civil servants, undefined	71
Local government officers	216
Defence Force, various capacities... ..	217

2. *Learned Professions.*

Such as clergymen, nuns, students, &c.	474
Lawyers, barristers, law officers, &c.	431
Doctors, medical students, dentists, &c.	591
Civil engineers, analytical chemists, draftsmen, &c.	185
State-school teachers, private teachers, gov- ernesses &c.	2091
Artists, engravers, photographers, &c.	224
Musicians and music teachers, vocalists, &c. ...	307
Actors, actresses, billiard table markers, &c. ...	188

3. *Domestic*

Wives and widows of no special occupation ...	34,643
Sons, daughters, relatives, not otherwise described	18,133
Children under five years, not otherwise described	43,071
Scholars attending State schools	43,217
Scholars attending other schools, &c.	13,468
Hotelkeepers, boarding-house keepers, &c. ...	2,959
Domestic servants, office-keepers, porters, &c. ...	13,928

4. *Commercial.*

Merchants, auctioneers, brokers, salesmen, &c.	4,424
Shopkeepers, their wives, hawkers, &c.	3,008
Railway servants, drivers, stokers, clerks, &c. ...	1,554
Draymen, carters, cabmen, grooms, &c.	5,103

5. *Marine, &c.*

Pilots, lighthouse-keepers, seamen, lumpers, &c.	3,976
Bond-keepers and others connected with storage	407
Messengers, errand boys, telegraph service, &c.	1,318

6. *Agricultural.*

Sugar planters	192
Others engaged in production of sugar	10530
Vignerons	44
Arrowroot planters	27
Cotton planters	2
Farmers and market gardeners	9,239
Farmers' wives living on farms	5,612
Farmers' sons, daughters, &c., living on farms	6,448
Farm servants, labourers, &c.	7,617

7. *Pastoral.*

Squatters and graziers with their families	2,813
Managers, overseers, servants, labourers, &c.	7,794

8. *Land Dealers, &c.*

Land-brokers, estate agents, &c.	37
Land surveyors, and assistants	465
Grubbers, bushmen, &c.	937
Others engaged on land, but not cultivating or grazing	199

9. *Engaged about animals, &c.*

Horse-dealers, surgeons, farriers, jockeys, &c.	770
Game and rabbit catchers and killers	13
Fishermen	718
Others engaged about animals	1,663

10. *Industrial.*

Working and dealing in art and mechanical productions, such as printers, publishers, bookbinders, booksellers, wood-carvers, carving, pattern-making, &c.	1,720
Mechanical engineers, tool makers, &c.	664
Coach-makers, saddlers, wheelwrights, &c.	1,690
Shipbuilders, ship-chandlers, sailmakers, &c.	405
House builders, carpenters, joiners, &c.	7,991
Furniture makers, cabinet-makers, &c.	716

Working and dealing in chemicals	...	...	21
Manchester warehousemen, drapers, silk dealers &c.	...	...	1,202
Tailors, machinists, and others working and dealing in dress	...	...	6,572
Working and dealing in fibrous materials	...	...	50
Working and dealing in food and drinks, such as brewers, bakers, poulterers, distillers, sugar refiners, &c.	...	...	5,706
Working and dealing in animal and vegetable substances, such as soap boilers, fellmongers, tanners, &c.; French polishers, japanners, turners, hay and straw dealers, &c.	...	...	5,736
Working and dealing in minerals, such as miners, goldsmiths, tinsmiths, &c.	...	...	18,591

As stated above, these figures are based on the census returns of 1886, but they are altered in method of arrangement, very much abbreviated, and in some instances items have been omitted altogether. It would only have been misleading, for instance, to have said there was one capitalist in Queensland, or 758 land proprietors, whereas in fact there are scores of the former and thousands of the latter in the colony. These are some of the vagaries of census returns.

FOREGOING NUMBERS APPROXIMATE.—The descriptions and numbers are general and approximate, and are quoted simply to give the British artizan and labourer some idea of the variety of vocations engaged in in this young country. The reader will notice that they include in some shape nearly all the trades and employments of the Old Country, and others which are peculiar to the colonies.

TOBACCO FACTORIES.—In some of the industries mentioned very little has been done, and the openings for the establishment of new industries are many. At the end of 1886 there were only seven tobacco factories, and the output of the whole was only 597 cwt. of tobacco. The imports of this article for the same year were 8,478 cwt. 25 lbs., and 51,210 lbs. of cigars, and these were subject to a duty of 2s. 6d. and 5s. per lb. respectively. In different districts the tobacco plant grows luxuriantly. The average price for “fillers” in Brisbane is about 4d.,

and for "wrappers" 8d., but sometimes for extra good quality as much as 1s. to 1s. 3d. per lb. has been paid. Smoking is perhaps more indulged in in the colonies than in England; the shepherd in his solitude, the digger, stockman, farmer, squatter, sailor, bushman, mechanic, labourer, merchant, clerk, men in all the callings and conditions of life find in pipe, cigar, or cigarette companionship and solace in the free use of this favourite plant. Sufficient capital, the very best machinery, first-class workmanship, and proper management combined should result in the growth of a well-paying industry, as the demand is constant and ever-increasing.

TOBACCO MANUFACTURE IN NEW SOUTH WALES.—There is only one tobacco factory in the colony owned by a limited liability company, and its operations have been limited and are now suspended, owing to its insufficient working capital. In New South Wales there were in 1886, seventeen tobacco factories, nine cigar and cigarette factories, employing 703 hands, and with the aid of the proper machinery 1,853,407 lbs. of colonial leaf and 651,514 lbs. of imported leaf were manufactured into 2,044,240 lbs. of tobacco and 12,465 lbs. of cigars and cigarettes, the total value being £313,314. These figures serve to show what might be done in Queensland, where both the growing and manufacturing might be carried on as easily, as profitably, and as extensively in proportion as in New South Wales.

WOOLLEN MANUFACTURE.—There is only one woollen factory in the colony, and yet Queensland exported during the same year over 28,000,000 lbs. in weight of wool of the estimated value of £1,413,908, and imported in the same year £93,062 worth of woollen piece goods and £23,582 worth of blankets. It is surely an anomaly for a country that requires, say, £120,000 worth of woollen goods every year to send its raw material 16,000 miles away, and then have to bring what it needs of the manufactured goods 16,000 miles back again, and yet this is an anomaly that is found more or less in all the Australasian colonies.

FISH IMPORTS.—THE FISHERIES ACT, NEW ZEALAND.—Tinned, salted, and dried fish imported in the same year amounted to £31,543, and the only kind of fish that

was exported, which was the produce of Queensland waters, was oysters to the value of £8,533. Edible fish of many varieties abound in the creeks and rivers, and off the coast, and if there were anything like the pressure of necessity that obtains in largely populated countries, the fishing industry would afford employment to thousands and supply food to tens of thousands. Fish can often be obtained very cheaply in Brisbane, but the supply in other places is fitful and uncertain, and any earnest attempts at a fish preserving and exporting trade have not yet been made. This also is a neglected industry in the other colonies, but in New Zealand "The Fisheries Encouragement Act" was passed in 1885, and is to remain in force for seven years from that date. Its chief feature is the granting of bonuses for the establishment of fish-canning and curing industries, and the Act has already resulted in enterprise and encouraging results in that direction. In view of the "woful want" of the world the "wilful waste" of resource in this matter is the more to be regretted. Schnapper, groper, mullet, perch, gar, cod, jew, whiting, and many other varieties abound, and without prolonged voyages and without exposure and peril such as are incidental to the fisheries of the Northern Seas, tens of thousands of tons of some of the finest varieties of fish known could easily be caught and cured every year.

CHEMICAL WORKS. — Considerable quantities of chemicals are imported annually, many of which could be easily and profitably manufactured in the colony. £9162 worth of sulphuric and other acids alone were imported in one year, and £28,545 worth of drugs. Attempts have been made to establish chemical works, but in this case property and industry are in antagonism—strong and unreasonable prejudice against the creation of such factories in any locality that would be suitable and convenient has hitherto prevented their establishment. There is no powder or ammunition factory in the colony, and the value of this class of goods imported in 1886 was £34,956.

BREWERIES. — There are twenty-two breweries in operation doing a large trade, yet of beer in bottle and in wood £158,122 was expended in importations of this article of consumption. The imports amounted to 902,876

gallons, and the quantity manufactured in the colony was 2,161,258 gallons. There are very few boot factories in the colony, but with most of the raw material in abundance the wonder is that leather or boots are imported at all. Yet the value of the leather and leathernware imported for the one year was £27,442, and of imported boots and shoes £156,286.

IMPORTATIONS OF CEMENT.—Cement is in constant and ever-increasing demand, both for public and private works. In one year 65,028 barrels were imported, at a first cost to the importer averaging 8s. 8d. per barrel. The duty on cement is 2s. per barrel—equal to a protective tariff of nearly 25 per cent. on the first cost. It would be unreasonable to suppose that Queensland, with almost every mineral material known, does not possess the necessary ingredients in sufficient quantities for the manufacture of first-class cement. What is true of New Zealand is substantially, and we hope prophetically, true of Queensland:—"Natural cement stones, or septaria, occur in the lower part of the marine tertiary series, and in some cases are quite equal in quality to those which are burnt for the manufacture of hydraulic cement in Europe. The cement hitherto used so largely in New Zealand has been imported, but, with the great resources the colony possesses in the raw material for the manufacture, this will probably not be long continued."

BOTTLED AND DRIED FRUITS.—Bottled and dried fruits are another large item amongst imports, amounting in the one year to £41,881. There is some prospect, however, of an attempt being made to establish a raisin drying and curing factory by a gentleman recently arrived in the colony, who has had considerable experience of the growth of grapes and the subsequent treatment of the fruit in countries where this industry is successfully carried on. He has visited the neighbourhoods of Roma and Mitchell, and after careful inspection of the magnificent vineyards, and some study of the soil, climate, and general characteristics of the locality, he is so thoroughly assured of its adaptation to all the requirements of the industry that he has resolved, with or without public aid, to commence operations without delay.

OTHER POSSIBLE BUT NEGLECTED INDUSTRIES.—Amongst other multitudinous openings for capital and enterprise we may mention that there are no glass-works, hosiery works, iron-works (smelting from the ore), kerosine works, oil and colour works, paper works, salt works, starch works, and many others that might be mentioned are wonderfully and invitingly conspicuous by their absence.

There is an abundance of shops but a scarcity of factories, too many competing in the selling and too few engaged in the manufacturing and producing of the commodities of life. Interest at high rates on well secured loans is so easily obtained, and land speculation is so rife, that manufacturing industries are neglected. Outside capital and Old World enterprise are needed. Men of little means are reluctant to venture their all in experiments when they know how difficult it often is to overcome the prejudice against colonial-made goods, however excellent the quality may be. But this prejudice may be overcome by practical knowledge, artistic skill, and production of articles in demand at prices that can compete with the prices charged for imported goods of the same class.

The Ipswich Woollen Factory has overcome it, after years of persistent struggle, and now its fabrics are in great demand. The engineers of the colony have overcome it, and in addition to bridges, barges, boilers, engines, dredges, and many other kinds of works, the Government has recently entrusted them with the manufacture of 75 locomotives for the Government railways. Railway carriages, luggage vans, goods and coal waggons, have long ago ceased to be imported, and are now made at the Government workshops or by private firms.

Very marked has been the success of many men in Queensland who, even with little means, but with unflagging application and industry have established some of the oldest and best known firms, and some of the chief existing industries of the colony.

GOVERNMENT WORKS.—LOCAL GOVERNMENT WORKS.—The Government is the largest employer of labour, in consequence of so many things being done by the Government which in older countries are undertaken by private



SAWMILL.

enterprise. The railways, telegraph lines, postal service, lands and works, harbours and rivers, education, customs, police, defence force, law offices, &c., are all under Government control, and each employ a large number of the salaried and wage-earning portion of the community. The divisional boards and municipal councils, which now constitute the local government bodies all over the colony, also employ a large number of men in clearing timber, constructing roads, making dams, culverts, bridges, cuttings, and all purely local works of improvement and communication. These bodies are everywhere ably seconding the more national undertakings, and making traffic and intercommunication more easy and pleasant.

TIMBER GETTERS.—Many men are engaged in getting timber in the log and conveying it to the sawmill proprietors, selling it at a figure which varies considerably according to the state of the building trade. A man takes up a selection on which there may be hundreds of pounds' worth of valuable timber, pine or hardwood. If it is within reasonable distance of a sawmill or a railway station he gradually cuts it down and disposes of it at so much per hundred superficial feet; or, without having a selection of his own, he may cut timber on Crown lands on payment of a license fee and certain royalties, differing on different kinds of timber. An ordinary license costs 5s. per annum and the royalties are 1s. on beech, all other kinds of hardwood 3d., pine 6d., and cedar 2s. on every hundred superficial feet. There have been many instances in which a selector has obtained far more for the timber on his land than the land cost him, thus obtaining the land for nothing and sometimes a substantial sum of money to the good. The demand for wooden railway sleepers has also been a means of considerable employment and profit to many bushmen and settlers.

CARRIERS. — The conveyance of goods to inland townships, distant pastoral stations, and gold-diggings not yet favoured with railway communication, is another calling in which considerable numbers are engaged. This is done by means of horse or bullock teams, and is a lucrative employment, especially the conveyance of goods to new and flourishing gold-diggings, where "money is no object."

RATES OF WAGES.—A few words on the ruling rates of wages, which is a matter of great interest to many, will form a fitting conclusion to this chapter. It may be safely said that, all things considered, the wages paid, the delightful climate, the facility with which land and cottages can be acquired, the cheapness of food and clothing, and all the possible advancement of the future, labourers are better off in Queensland than artizans are in England; while the position of artizans is proportionately better than in the "Old Country." The rates of wages given below are obtained from official sources, based on the fullest information, and may be regarded as being reliable.

WAGES.

Average Rates of Labour in Queensland, 1886.

ARTIZAN LABOUR.

PER DIEM.

Tailors	...	...	...	10s.
Masons	...	...	...	10s.
Plasterers	...	...	...	10s.
Bricklayers	...	...	...	11s.
Carpenters	...	...	...	11s.
Painters	...	...	...	10s.
Blacksmiths	...	...	...	11s.
Wheelwrights	...	...	...	10s.
Brickmakers	...	...	...	7s.
Bookbinders	...	...	...	10s.
Watchmakers	...	...	...	10s.
Whitesmiths	...	...	...	10s.
Coopers	...	...	...	10s.
Shoemakers	...	...	...	9s.
Engineers	...	...	...	12s.
Cabinet-makers	...	...	...	12s.
Brassfounders	...	...	...	12s.

Agricultural Labour.

Average wages per annum, with board and lodging.

				£	£
Farm Labourers	...	...	...	40	to 50
Ploughmen	...	...	...	40	„ 52
Reapers	...	...	...	40	„ 45
Mowers	...	...	...	40	„ 45
Threshers	...	...	...	40	„ 45
Bush Carpenters	...	...	...	40	„ 60

<i>Pastoral Labour.</i>				£	£
Shepherds	...	...	...	40 to	50
Stock-keepers	...	...	...	40 „	60
Hut-keepers	...	...	...	30 „	40
Generally useful men	...	...	...	40	
				s.	s.
Sheepwasher, per diem	...	...	...	5 to	7
Shearers, per 100 sheep sheared	...	...	...	15 „	25

Servants—Males and Married Couples.

	£	£
Married Couples, without family	60 to	65
Married couples, with families	50 „	52
Men cooks, for hotels	50 „	60
Grooms and gardeners	52	
Gardeners, per diem, without board	6s.	

Females.

	£	£
Barmaids	20 to	50
Cooks	30 „	40
Laundresses	30 „	50
General Servants	20 „	35
Housemaids	20 „	30
Nursemaids	18 „	25
Farm-house servants	26 „	35
Dairy women	26 „	35

Miscellaneous Labour.

Quarrymen	...	10s. per diem.
General Labourers	...	6s. to 7s. 6d. per diem.
Seamen	...	£4 to £6 per month

These may be taken as fair average quotations, though in some branches it sometimes happens that men will work for less rather than not be working at all. The general public, however, seem to regard these as being fair standand wages, and with ordinary prosperity they are likely to remain unchanged for a long time to come. Owing to the fluctuations of trade men are sometimes unable to obtain work at their own special handicraft, but something will turn up, and Queensland is a land where a man must not and need not stick fast if he cannot obtain employment in his own particular line of business.

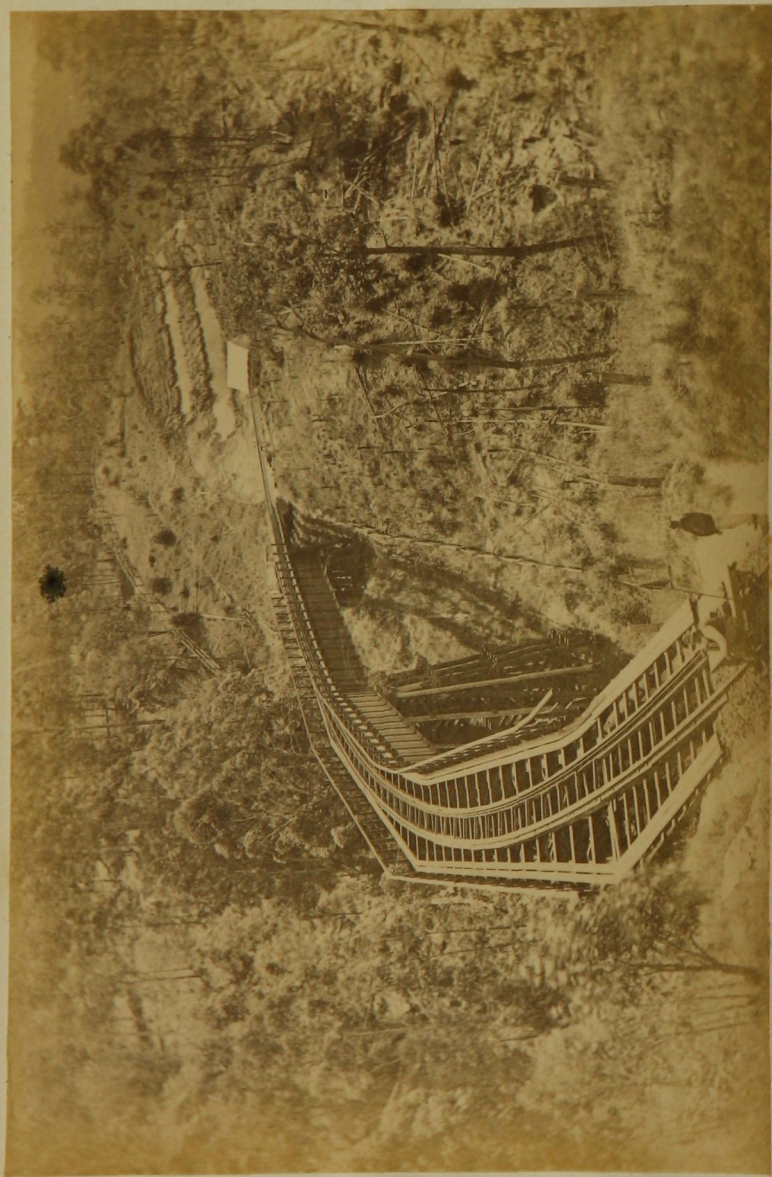
EIGHT HOURS PER DIEM.—Eight hours per diem is the recognised limit of work with artisans and their labourers, anything beyond that being specially paid for by the employer as overtime. There are the usual workmen's protective and benefit societies, and the interests of members are attended to and guarded with zealous care. Workmen in the bush and on farms, as is usual all the world over, work longer hours, but probably not with such continuous application, and it may be safely stated as a general truth that in all the relations of life the disposition appears to be to expect a fair day's work only for a fair day's pay.

HONOURABLE INDUSTRY.—Many and various are the callings and occupations of the people. There are no strongly and clearly defined class distinctions. The State schools begin the work of levelling upwards. The children of labourer and landlord, artisan and merchant, meet on terms of perfect equality, learn the same lessons, compete for the same rewards and honours. Wealth and reverses are possible to all and the chances of life are not destroyed by one disaster. Ignoble and unworthy class distinctions, assumption and pretence and arrogance exist, in some measure, but the institutions and laws of the land do not recognise or encourage them; they are foreign to the spirit, temper, and genius of young Australia. All honest work is honourable, and many men now occupying leading positions in the various walks of life—merchants, pastoralists, professional men, legislators—are not ashamed to have it known that they once tended sheep, drove a team of bullocks, "humped their swag," or did any one of the many forms of hard work which had to be done before they reached the comfort, competency and honours of their manhood's prime or their declining years.

CHAPTER VII.

PUBLIC WORKS AND FINANCE.

QUEENSLAND LOANS.—AMOUNT PER HEAD OF POPULATION.—With the few inhabitants constituting the present population of the colony the wonder is that so many public works have been undertaken, and many of them successfully completed. These works could never have



SOUTHERN AND WESTERN RAILWAY.

been entered upon if the Governments of the day had had to depend upon revenue alone. The answer is, that Queensland, in common with the other colonies, has not only been a large buyer in English commercial markets, but also a large borrower from time to time in the English money market. The total amount of loans which had been authorised by the Legislative Assembly to the end of 1886 was £26,550,850. Of this total amount £20,820,850 had been sold, leaving £5,730,000 of the last loan authorised which has not yet been offered. This amount of indebtedness has been accumulating in loans of various amounts since 1886, and cost, in being issued below par, £1,236,055 15s. "*The Loan Bill of 1884*" was the largest by far that has yet been passed, and authorised the borrowing of £9,980,000. This loan has not yet been disposed of nor offered to the public to the extent of one-half of the amount sanctioned, over five and a-half millions being yet available for further requirements. The first loan does not fall due until 1891, but interest on the entire debt of the colony has to be paid annually out of revenue, and for the one year, 1886, amounted to £811,565. This is a heavy obligation for a young and small community, being equal to £64 9s. 9d. per head of population loan indebtedness, and £2 10s. 3d. per head per annum for interest.

EXPENDITURE OF LOAN MONEY.—The system of estimating a country's financial position by its loan indebtedness per head of population is, however, a defective one, and a totally misleading one when applied to the colonies of Australasia; it is like estimating a business firm's position by taking careful note of its bills current and open accounts owing, and ignoring its trade, its properties, and all its diversified and substantial assets. Practically the British public have disregarded this mode of judging the position and solvency of national borrowers. Knowing that so far as the colonies are concerned the borrowed money is applied to works of peace, progress, and development, some of which will ere long be highly profitable to the colony financially also, the various loans applied for have been granted without grudging and without fear. For the first two loans of 1866 and 1870, Queensland pays 6 per cent., and for all subsequent loans

4 per cent. per annum and all interest is made a primary charge on the revenue. The various loans have been raised for public works, railways and immigration. The expenditure from loan funds in 1886 amounted to £1,923,014 8s. 1d., and a list of the items of expenditure will best show that the money willingly lent is being wisely and profitably spent.

	£	s.	d.
Immigration	179,074	3	1
Railways	1,254,375	18	0
Electric Telegraphs ...	78,998	10	11
Defence of the colony ...	39,945	3	7
Harbours and Rivers ...	126,715	12	1
Lighthouses	3,401	16	7
Loans to Local Bodies ...	119,750	0	0
Buildings	13,403	6	11
Water Supply, Loans on			
Account of	258	18	6
Water Storage, Main Roads	46,010	3	4
Main Roads to Goldfields	210	2	6
Bridges, Main Roads ...	3,421	0	0
Roads, Board and Shire			
Councils—Grants ...	467	9	11
Railways — Unforeseen	56,982	2	8
Expenditure			

Total Loan Expenditure £1,923,014 8 1

ASSETS COMPARED WITH LIABILITIES.—Queensland possesses splendid assets as against all her liabilities to the public creditor. First of all (without which all other things would be of little value) she has amongst her population tens of thousands of colonists who have been brought to her shores at the national expense by her admirable and liberal immigration system. These are now in a hundred ways not only making a comfortable living themselves, but making Queensland better adapted to the wants of the tens of thousands who are yet to follow. No statistician can estimate the real value of every industrious man and thrifty woman in a land like this—these are values and results which cannot be tabulated in any schedule, all other things are but the outcome of human labour applied to the ample provisions of nature.

RAILWAY WORKS.—At the end of 1886 Queensland had 1,555 miles of railway completed and opened, and 371 miles in progress, on which £10,716,352 have already been expended. In 1876 Queensland had only 300 miles of railway, and the enterprise and energy displayed in thus opening the interior by the best means of communication cannot but result in immensely increased value to the private properties and unalienated Crown lands of the interior.

RAILWAY RECEIPTS AND EXPENDITURE.—**POST AND TELEGRAPH SERVICE.**—These railways necessitate the running of 189 locomotives, 206 passenger carriages, and 2,709 goods waggons. The total receipts from all sources of traffic for the ten years ending 1886 were £4,221,605 1s., and the total working expenses £2,601,483 15s. 7d. It will thus be seen that already the railways far more than pay all working expenses and contribute largely to the interest of their cost of construction. With closer settlement, resulting from the better use of the agricultural and grazing lands of the interior, the traffic will undoubtedly be increased in a much greater ratio than the increase of working expenses, and the margin available for interest will become greater in consequence. Next in importance and utility the colony had, in the same year, 8,225 miles of telegraph line, along which in the one year were transmitted 849,539 ordinary messages of the value to the revenue of £78,657 13s. 9d. The Post and Telegraph Department is worked at a loss, owing chiefly to the great cost of working the inland and scattered districts of the bush, entailing heavy expenditure in the carriage by horse service of correspondence and printed matter in the shape of newspapers, &c. But it is considered better to submit to a loss for a time than to impose heavy postal rates on letters or any postal charge on newspapers, which would have the effect of depriving many of useful information. From loan and revenue, roads have been constructed, harbours and rivers have been made navigable, the coast and channels have been lighted and buoyed, solid and costly public buildings have been erected, bridges have been built, and a multitude of other important works have been done, all tending to the constant improvement of the public estate,

and affording facilities to trade and communication which will tell more and more favourably on the resources and revenue of the colony every year.

PRESENT EXPENDITURE FOR FUTURE BENEFITS.—The expenditure of borrowed money is, of course, one cause of prosperity, and the Government is the largest employer of labour. It could hardly be otherwise in a young country bent on progression. Present labour and outlay are laying the foundations of future stability, strong and deep, and when the days come that the loans must be repaid, the colony's ability to pay or to borrow will be greater than it is now. There will be more to share the burdens, as there will be more to share the blessings, of the spirited enterprise and liberal policy of public works of the present day. There are millions of acres of Crown lands that are being constantly improved by this expenditure, and from which ample means to pay off all loans could be raised in due course, if it were ever found necessary or advisable to part with the public estate for such a purpose. Meanwhile, in the certain knowledge that these lands cannot diminish in value, but will become more and more valuable through public expenditure and increased settlement, the wisest policy appears to have been adopted in holding them in perpetuity for the "greatest good of the greatest number."

CHAPTER VIII.

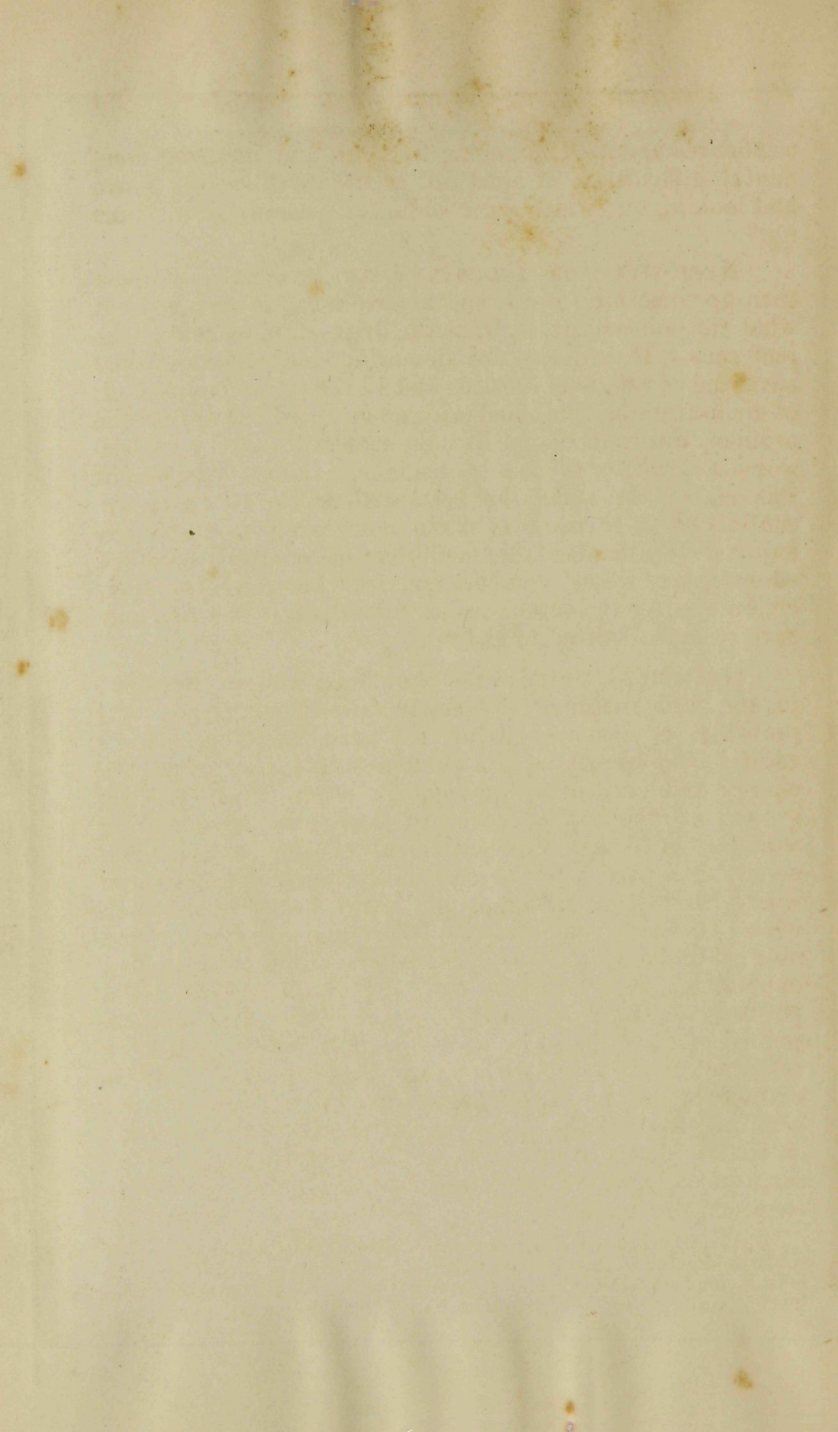
BRISBANE—OTHER PRINCIPAL TOWNS— CONCLUSION.

This handbook would be seriously incomplete if it did not afford to the intending emigrant some brief information as to the social life of the colony, its political, civil, educational and religious institutions. Some idea of these matters may be gathered from the few pages of this concluding chapter.

While Queensland is pre-eminently a country where steady perseverance and work are essential to success, yet a man who aspires to something above the perpetual routine of daily toil for himself and family will make none the worse a colonist. But the aspiration must not be mere longing for something that is not, resulting in dissatisfaction with what is. The aspiration must be an inspiration,



BRISBANE AND BRISBANE RIVER.



a laudable ambition impelling to effort and ignoring incidental difficulties; it must not eventuate in sitting down and looking on, waiting the while for something to "turn up."

NECESSITY FOR INDUSTRY AND ENERGY.—It must turn up something itself, and ascertain on its own account what the soil will grow, what the drift contains, where the reef runs. If a desire for domestic comfort, educational advantages, religious services and the various institutions of civilisation be combined with energy and industry in the ordinary duties of daily life, the man will make none the worse a farmer or mechanic or miner. Indeed it is men of this class that make the best settlers, for to them the routine of daily work is made not merely tolerable but enjoyable by the laudable ambition of securing comfort, education, position, competency, for themselves or their children, after the few years of "roughing it" which may have to be submitted to at first.

GROWTH OF BRISBANE.—Should he land in Brisbane in the first instance the newly-arrived immigrant will probably be astonished at the size of Queensland's capital, the beauty of its surrounding scenery, and the energy and enterprise apparent in every direction. The growth of the capital cities of Australia is something wonderful, and had the settlement of the land in each colony kept pace with the growth of the chief cities there would have been hundreds of happy homes in the bush where there are only scattered dwellings to-day. Some idea of the rapid growth of Brisbane in its dimensions, population and commerce may be obtained from the perusal of the following extract from the *Gazette* published in Sydney in December, 1841—followed by a reference to the latest census and Custom returns. This extract refers to a time eighteen years prior to the granting of separation, and the article was no doubt considered by many at the time to be a good specimen of sanguine colonial "blow"; but how vastly has the result exceeded the prediction!—

"A settlement on the east coast of Australia, situated in latitude south 27 degrees 30 minutes and longitude 153 degrees 10 minutes, has been a penal settlement for about twenty years. All the prisoners have lately been sent away, and Mr. Dixon and party have been upwards of

two years carrying on a survey, preparatory to its being thrown open for location. The climate is fine and healthy, the soil of the richest description, clothed with abundance of grass, and well watered, having the fine rivers Brisbane and Logan navigable for steamers a considerable distance from the coast, on the banks of which coal, lime and iron can be obtained. The facilities offered by this beautiful part of the colony have induced an immense number of large stockholders to take up squatting licenses both on the east and west sides of the Great Dividing Range, and it is supposed that upwards of 1,000 bales of wool will be shipped at Brisbane Town after the present shearing is over. Brisbane Town, the present settlement, is situated about sixteen miles up the Brisbane River, pleasantly on rising ground, and consisting of several good and substantial buildings. The present population, consisting of civil officers, troops and convicts, amounts to about 280 souls. Little doubt remains but that this will soon, when open, become a fine flourishing settlement."

Such was Brisbane in 1841! What is it now? A queenly city with streets, gardens, villas, warehouses, stores, churches, banks, and Government buildings, many of which, for grace, beauty, and solidity, are not to be excelled by many an important English town, the outcome of centuries of existence.

TRADE AND POPULATION OF BRISBANE.—Instead of 1,000 bales of wool as in 1841 over 28,000,000 pounds weight was shipped in 1886 from the colony. Instead of several good and substantial buildings, the estimated total value of the rateable property of Brisbane is over £7,000,000, and instead of a population of 290 souls as then it has within the municipal boundaries over 32,000 inhabitants and about 6,000 dwellings. The population of the city and suburbs within a radius of five miles from the General Post Office was at the last census 73,649. The Brisbane River is spanned by a costly iron bridge and the foot and vehicular traffic across it is very large. The river itself is navigable right up to the wharves of the city for vessels of almost any tonnage, and the steamers of the British India Company berth right in the heart of the city.

There are many other coastal and inland towns, the names of which in some cases are almost synonyms to colonists of the particular discoveries, pursuits, or industries which called them into existence, or for which they are particularly noted.

IPSWICH.—WOOLLEN FACTORY.—RESOURCES OF THE IPSWICH DISTRICT.—Ipswich, on the Bremer River, and about twenty-four miles distant from Brisbane, is the centre

of an old and extensive farming district. It is surrounded by farming hamlets, and was at one time the chief cotton-growing district. Now it is a steadily prosperous town of 7,576 inhabitants, dependent chiefly on the surrounding farms and collieries; this being also the district where coal mining is most extensively carried on. It has also extensive Government railway workshops, which furnish steady employment to a large number of fitters, carriage builders, smiths, and mechanics of various kinds. It may be here stated that the whole of the rolling-stock for Queensland railways will, in all probability, soon be made in the colony. There are several firms of railway carriage and truck builders, and contracts for seventy-five locomotives have been entered into between the Government and Brisbane and Ipswich firms. At Ipswich is situated also the only woollen factory in the colony. For many years the directors had hard uphill work, and the shareholders had to be content to do without any return on their investments. The principal reason of this was the prejudice existing against colonial-made tweed. Perseverance ultimately conquered, and the mill is now an established institution, and a dividend-paying concern. It is hoped by all who note the anomalies of Queensland's imports and exports, and who wish to see this grand country making the best of its resources, that this is only the first of many mills of the same kind. Wool, water, and coal are abundant, and in the years to come the Bremer may be as the Aire, and Ipswich as the Leeds, and West Moreton as the West Riding in the quantity and quality of their manufactures. Ipswich is distant by rail about twenty-three miles from Brisbane.

TOOWOOMBA AND WARWICK.—ALLORA.—RAILWAY COMMUNICATION WITH OTHER COLONIES.—Toowoomba and Warwick are situated on the Darling Downs, and are amongst the "health resorts" of Queensland. Toowoomba is about 2,000 feet and Warwick about 1,500 feet above the sea level. They are distant from Brisbane 100 and 166 miles, respectively, by rail. They are surrounded by squatters' stations and farms, the pastoral and agricultural interests having originated them and being their principal support. They enjoy a milder climate in summer, but have a severer winter season than the towns situated on the coast lands

between the sea and the Great Dividing Range. Laid out with wide parallel and rectangular streets, they have always about them an appearance of steady prosperity. They are remarkable for the variety and quantity of fruits grown there in addition to the ordinary Queensland agriculture. Warwick and Allora are in the midst of the principal wheat-growing and flour-milling district in the colony. The Southern and Western Railway system, being one of the grand trunk lines running from the coast into the interior, has been constructed as far as Charleville, and connects Brisbane with Ipswich, Toowoomba, Warwick, Stanthorpe, Dalby, Roma, Mitchell, and Charleville. Brisbane is also now connected with Sydney (a distance of 723 miles) and the southern colonies by railway. The distance from Brisbane to Roma is 318 miles, and the line from Roma continues a further distance inland of 250 miles. Even then, though 92 miles long, and going almost due west, the line does not reach half the distance to the western boundary.

MARYBOROUGH.—Further up the coast, situated on the Mary River, is the town of Maryborough, the centre of large farming, sugar-growing, and timber-getting industries; and connected with it by rail is the town of Gympie, distant from Maryborough about 61 miles. There are several lines of railway tapping the agricultural lands and coal country in the neighbourhood of Maryborough. Further up the coast again is Bundaberg, another grand agricultural district, devoted chiefly to sugar and maize. The soil is of the best, and it has the advantages of a railway connecting it with Maryborough, and another connecting it with the Mount Perry Copper Mines.

ROCKHAMPTON.—Further north again is Rockhampton, on the Fitzroy River. It is chiefly dependent upon the rich pastoral country in the interior, and a number of small gold diggings which surround it. It is only a few miles distant from Mount Morgan gold mine—more correctly a hill of gold—of fabulous richness and world-wide fame. Rockhampton is the port and eastern terminus of the second trunk line known as the Central Railway, the total length of which to its present terminus, Barcaldine, is about 358 miles.

MACKAY. — TOWNSVILLE. — CHARTERS TOWERS. — Mackay is within the tropics, and is situated at the entrance of the Pioneer River. Its *sobriquet* is "Sugaropolis," as it is the port of the largest and best sugar-growing district in Queensland. Many sugar growers, who first commenced operations in a small way further south, wishing for better soil, more room, and immunity from frosts, found all they required on the rich banks of the Pioneer River. Several millions of money have been spent on this industry in the Mackay district, and perhaps there is no place in the world where the conditions for an immense sugar industry are so fully supplied as at Mackay. Private railways and tramways, powerful steam ploughs, magnificent machinery, costly mills, long processions of sugar-laden drays, a thriving busy town called into existence as by magic—these are amongst the things to be seen at Mackay; and despite all labour difficulties, the district is destined to become the home of a settled, established, and profitable industry, to which it is in every way adapted. Still, keeping to the coast, and advancing further north, Townsville is the next port of considerable importance—a town of recent origin, rapid growth, and great promise. Should the time come when it will be found advisable to divide Queensland, Townsville will probably be the capital of the new colony. It is the port and terminus of the northern trunk line, which now at the beginning of 1888 extends to Hughenden—236 miles inland. This line connects Townsville with Charters Towers Gold Field and a branch southward, 24 miles, connects it with the Ravenswood Gold Field. Charters Towers is a town of rapid growth and a career of great prosperity. It is one of the best (if not the best) and richest, quartz-reefing districts in Queensland. Some of the mines acquired such a reputation for great yields and permanency of supply that they were easily sold to British investors at high figures.

CAIRNS.—Still further north again is Cairns, which is now being united by railway to Herberton, and the rich agricultural and mineral districts in that locality. Cairns will probably advance as rapidly as Townsville.

COOKTOWN.—Cooktown is the last town of importance northward, and will be likely to grow into considerable importance for shipping purposes, owing to its proximity to the Pacific Islands, Torres Straits, and the settlements of New Guinea. At the end of 1886 it had railway communication with the Western interior by a railway 31 miles in length.

FIRST IMPRESSIONS.—Supposing that he lands in Brisbane, the first feeling of the immigrant as he approaches the city from Moreton Bay will be one of pleasure. The sparkling waves of the sheltered anchorage, with the first glimpses of the new land, the cooling breeze, the shining river, the verdant foliage, then the picturesque villas of well-to-do citizens, and the neat cottages of working-men, all overarched by the clear blue sky, form a picture the memory and first impression of which will not be readily effaced. His next feeling will be one of surprise—unless he be one of those self-sufficient individuals who profess never to be surprised at anything. New arrivals generally admit that they did not expect to see such a city, so extensive and so substantial. Well-paved streets, busy wharves, drays, cabs, 'buses, tramways, and, in short, all the surroundings of advanced civilisation—the result of the liberal expenditure of money by the Government, the municipal council, and private individuals.

DISAPPOINTMENTS.—**NEED OF PRESSURE TO PROMOTE SETTLEMENT.**—Then after a day or two the immigrant will set about the real object which he had in view in coming out—he will begin to look for employment. And now the chances are that his admiration will be modified, and his first disappointment will put his cheerfulness and courage to the test. He may search all over, and ask everywhere, and be willing to work at almost anything for almost anything, and yet he may be unable to get a "billet" of any kind in the capital. There is no scarcity of shop hands, accountants, clerks, artisans, or labourers in Brisbane. Of course in the changes which are constantly taking place, many from time to time, sooner or latter, do obtain employment in some capacity in Brisbane, but we wish to impress the fact deeply on the

mind of the reader that the capital cannot absorb all the people who would prefer to remain in it. The pressure of necessity which exists in England, and without which there would be no emigration at all, or very little, exists in a milder form in Brisbane also; if it were not so, little prospect would there be of the cultivation of Queensland's fertile regions beyond, or the inquisitive quest of hidden treasure deep down in hills out of which men may dig gold and tin and copper and coal.

FIRST OFFER OF EMPLOYMENT.—DWELLING AND RATIONS.—The new arrival *may* obtain, but should not depend upon obtaining, employment in Brisbane. But Brisbane is not Queensland, and if a man hangs about the streets and lodging-houses, *sans* money, *sans* courage, *sans* energy, *sans* everything—he can just as easily become a loafer, a pauper, a drunkard, or a criminal in Brisbane as in any other city, for the same temptations exist, and the victims of indolence, drunkenness, and vice are not few. We will suppose the case of a handy willing man; he is unable to get employment as a porter, a labourer, a shopman, or in any other capacity in town, but he may have the offer of an engagement on a farm or a run scores or hundreds of miles from Brisbane; the wages may be £35 to £45 per annum, or, if he is a married man, say £40 to £50 per annum for the services of himself and wife. We would advise the man to accept the offer promptly and cheerfully. The wages will be almost clear gain as, with the exception of clothing, everything will be supplied by the employer. The habitation may appear very primitive and rough at first; but the climate is genial and a little exposure to the fresh breezes of heaven will do no harm. The fare may be plain, so far as the prescribed rations are concerned; but in skilful hands beef and mutton and flour, with other little admixtures, may become the basis of fifty dishes. The rations supplied will be good in quality and sufficient in quantity for all reasonable domestic requirements.

SAVING MONEY AND GETTING EXPERIENCE.—If such a man as we are supposing goes to his engagement with alacrity, and enters on his work with observant eyes, he will gain as his reward a great deal more than his wages and rations—he will gain experience which will be of incal-

culable value to him when, after a time, he finds he has saved enough out of his earnings to enable him to take up an agricultural farm or a small grazing farm on his own account. Experience of soils, grasses, crops, timbers, seasons, animals and men, without which his best efforts might be thrown away and the hard-earned savings of several years be lost. Eighty or a hundred pounds even, with two or three years of experience, would be of more value, very likely, than £800 without it. Queensland is pre-eminently the colony for the man whose ideal of prosperity and happiness is the possession of a farm of his own, and who is willing to take the necessary steps to acquire one and turn it to the best account when he gets it.

EDUCATION.—Education is free, secular, and compulsory by law; but the compulsory clauses are held in abeyance for the present. The system and the results are admirable. The cost of the educational system is a heavy burden, but it is willingly borne, so varied and general are its benefits. Nearly all the denominations of Christendom worship and work in their own way; there is no State Church and no State aid to religion. Churches and ministers abound, and scores of little places of worship are to be seen in the settled districts in the bush.

NATIONAL HOLIDAYS.—The people spend their money freely, live well, dress well, indulge in frequent holidays, and do not stint themselves in recreations, amusements and pleasures. The national holidays are numerous—two days at least at Christmas-time, then also New Year's Day, St. Patrick's Day, Good Friday, Easter Monday, Queen's Birthday, Prince of Wales's Birthday, Separation Day, a day at the annual exhibition of the National Association, and a day in annual celebration of the triumph of the Eight Hours' Movement. Most of the old settled districts have also their special holidays in connection with annual races, or pastoral or agricultural shows. The holidays are typical of the diversified but harmoniously-blended elements of the young nation's life. They are the expression and evidences of old sentiments, old loyalty, old patriotism, and old national traditions and beliefs, blended with the younger and not antagonistic sentiments of past

triumphs and future hopes—the aspirations and endeavours of a young free land, conscious of its growing strength, proud of its resources, and sanguine of its future.

CONCLUSION.—The reader must now decide for himself, and he must use his own judgment. There are those who affirm our national system of immigration to be a great folly and a great wrong to those already here—and so, no doubt, there were when Queensland had not half the population that it has now. Let the reader bear in mind the facts placed before him in the chapter dealing with the extent and population of the colony. To stop immigration to Queensland would be to withhold, without sufficient cause, the helping hand by means of which most of the inhabitants of the colony have been delivered from the hopeless toil and ever-imminent possibility of poverty in the old land. There are many who grumble and complain, but they know perfectly well that they could never have been, and never have had, in Great Britain what they are and what they possess in Queensland. As the reader peruses these pages in his dinner-hour in the factory, or by the fitful firelight of his home on some winter night, let him contrast what is with what may be. And to do the alternative condition justice, he must feel in anticipation the thrill of pride and satisfaction of a man owning the land he tills and the habitation in which he dwells. He must fancy himself far away from a land of

“Sullen skies
And fields without a flower”—

and lanes and streets knee-deep in snow or sludge, to a land which should have some other name than winter for that season of the year so bright and bracing and beautiful—a land of blue skies and prolific soil; a community in which the highest positions and honours are open to him or his children; a land where comfort and true enjoyment of life are possible to all, and where riches and honour are impossible to none.

The following Table will show at a glance the conditions on which Grazing Farms and Agricultural Farms can be taken up in the Colony under the Queensland Crown Lands Act of 1884, and the Amending Act of 1885-6:—

Nature of Tenure.	Area.	Term of Lease.	Rent.	Re-assessment of Rent.	Conditions.	How made Freehold.
Grazing ..	20,000 acres maximum	30 years, transferable.	1d. minimum	At 10 years, and every 5 afterwards, but no increase over 50 per cent.	Continuous occupation by self or bailiff, and fenced within 3 years	Cannot; but lease may be sold, subdivided, mortgaged, or, with consent of Land Board, let or sublet.
Agricultural Farms	20 to 1,280 acres	50 years, transferable.	3d. minimum	At 12 years, ditto	Selector must be 18. Continuous occupation by self or bailiff; fence, or equal, within 5 years	Fixed price, minimum 20s. to 30s. an acre, 10 years' residence by lessee or qualified transferee. If not availed within 12 years, price re-adjusted like rent. All rent to be counted in part payment. May be sold, subdivided, mortgaged, or with consent of Land Board sublet.
Small Freeholds (Homesteads)	Not over 160 acres	...	6d. ...	...	6d. an acre for 5 years and survey fee, £7 7s. 6d., spread over 5 years. Deed fee, 30s.	Personal residence and improvements of the value of 10s.; can be transferred, but in that case full period of residence (10 years) and full payment.
Village Settlement	80 acres maximum, and 1 allotment in town	...	6d. ...	...	6d. an acre for 5 years, survey and deed fees spread over 5 years	The same; but one-fifth may be made on Town Lot.

PAPERS FOR THE PEOPLE

BY PRACTICAL MEN

ON

AGRICULTURE, HORTICULTURE, AND PASTORAL FARMING

IN

QUEENSLAND, AUSTRALIA.

QUEENSLAND.

PINE-APPLE CULTIVATION.

NOTHING surprises the horticulturist on his first arrival in Queensland so much as to see those plants on which it has been usual for him to expend all his skill and ingenuity to induce them to thrive in the old country growing here with a luxuriance it was impossible for him to anticipate. No plant is more conspicuous in this respect than the pine-apple (*Ananassa sativa*). In the old country glass-houses, furnished with hot water pipes, are specially constructed for its culture; its roots are plunged in hot tan, and the plants carefully syringed, shaded and attended, which makes the pine-apple essentially a fruit for the "upper ten thousand." But how different in this country, where the pine-apple grows with a luxuriance and productiveness that brings it within the reach of every working family. Nevertheless it is one of the best paying crops grown in Queensland at the present time. This is principally caused by the comparatively unlimited demand for this delicious fruit in the adjacent colonies of New South Wales, Victoria, South Australia, and New Zealand, in which colonies the pine-apple cannot be successfully cultivated. With the exception of the banana, the pine-apple makes the earliest return after planting, of any herbaceous fruit grown in this colony. The pine-apple is essentially a marine plant and thrives best near the sea, but it is very accommodating as regards soil. It will not endure stagnant water, therefore perfect drainage is absolutely necessary; and it is very sensitive to cold. In selecting land for pine-apple culture, position is the first consideration. It should be in a district where little or no frost occurs. A well-drained sandy ridge is excellent, or, still better, a ridge of red soil of volcanic formation, where the drainage is sure to be perfect. At one time of the year the westerly winds are very cold and piercing, so that the slope of the ridge facing north or north-east would be preferable. If no natural

shelter is near, shelter trees should be planted. For this purpose seedling oranges or loquats would answer perfectly well, costing nothing to raise, while they would ultimately pay for the ground they occupy over and above their services as shelter. Fifty to one hundred acres makes a very useful homestead, and is all a man requires for fruit-growing purposes to ensure a comfortable income. Having determined on the site and the extent of land, fencing has to be next considered. A wire fence with wooden posts is at once the best and most economical in every respect. There is usually plenty of timber on the land from which posts can be split. For cutting and splitting posts contract price in the coastal districts of Southern Queensland is about a guinea per hundred. For putting up a fence of five wires, contract price is about 6s. per chain. If the posts have been carefully selected from ironbark, which grows plentifully in the district, a fence of this kind would last for many years, the first cost amounting to about 12s. per chain. Supposing the land to be forest land, clearing would be the next operation. Falling the timber and burning off, taking out all stumps and roots to a depth of 15 inches, thus preparing the land for the plough, would cost by contract about £8 per acre. The land would then be ploughed by bullock-team at a rate of about £2 2s. per acre, next harrowed, and the small roots drawn out by the harrow should be burnt on the ground. The land is then cross-ploughed, which work is usually done by the owner or his workman, as it is necessary for him to have a plough and two horses for future culture. Of course much of the work of fencing and clearing could be done by the settler himself, to whom the cash outlay might be a consideration, especially if he have one or two strong sons to assist him.

After again harrowing and cross-harrowing, the land will be ready for planting, which is done as follows:—For long lines, to keep them straight, it is best to have three sticks with knobs of paper or rag tied on the top to give the line of sight, by being placed in line with each other at the distance required. The pine-apple suckers having been obtained and properly dressed, that is to say, their bottom leaflets stripped off so that the young rootlets can have free action, they are then laid along the row within reach of the planter, he being furnished with a tool called

in the old country a pick-hoe, but better known here as a chipping-hoe. The planter then picks out the holes with his hoe about four inches deep, taking care to keep them in line by means of the three sticks, and plants the suckers as he goes along, making them firm by pressing his feet on each side of the sucker. In this way a good workman will plant about 500 suckers in a day of eight hours. It is usual to plant from 2,000 to 3,000 suckers per acre in rows from 4 feet by 8 feet to 6 feet by 2 feet, according to the kind of soil and variety of pine, strong growers, of course, requiring the greater distance. January and February are the best months for planting, for the reason that the suckers are then more easily procurable, and the soil being warm the plant commences to root at once and gets well established before the winter sets in. The following summer many of the strongest suckers will produce fruit, though probably only of second class as regards size; still they will produce something. The next spring and summer the owner may expect the majority of the plants to produce one good fruit, and, supposing him to have planted 3,000 suckers per acre, he may calculate on having 2,000 fit for market. The average market price at the present time is 2s. 6d. to 3s. per dozen. His receipts would thus be about £20 per acre.*

If the plantation has been well cared for in the way of being ploughed and scarified from time to time, and kept free of weeds, after the first cutting of fruit the plants will throw up about four or five suckers to each plant, and each of these suckers will produce a fruit the following spring or summer. These fruits will not be quite so large, but the owner may safely calculate on a return of sixpence per plant, or about £75 per acre. Opinion differs considerably as to the number of suckers that should be planted per acre, but the above estimate is taken from the basis of my own practice. In a few years the plants become a solid mass, and a track between the beds is kept open only by trimming the plants with a reaping hook.

Hitherto no disease that we know of has attacked the pine-apple. Some old plantations which have been planted twenty-five years, and produced a large crop annually, are now showing symptoms of decay, and the owners are wonder-

* The price to be obtained for pines, and the profit of cultivating this fruit as here given, are considered to be over-estimated.

ing what can be the cause, but surely no practical man can expect any plant to continue to produce a remunerative crop after twenty-five years on the same soil.

I would advise intending settlers not to plant a large area at the outset, unless they have means to carry it out well, but to begin with, say, three acres, and gradually work along year by year until the intended area is planted, always remembering that thorough cultivation is the first principle of success.

After the pines are planted, a man with one horse and a small plough and a scarifier will be able to look after and keep in order ten acres of planted land.

The principal varieties of pine-apples grown in Queensland are :—

RIPLEY QUEEN.—A first-class pine in every respect, with fine broad foliage and dwarf habit. A good winter bearer; fruit large; flesh fine and of excellent quality.

COMMON QUEEN.—Of which there are several varieties all being very productive, and of good average quality.

SMOOTHED-LEAVED CAYENNE. — Strong grower. A large showy fruit, first-class quality, not so productive as the Queens, but usually fetching a higher price in the market on account of its size. If well grown, the fruit often reaches from 10 lbs. to 15 lbs. each, but usually averages about 8 lbs.

PROVIDENCE.—A very strong grower; produces a fruit of large size; a shy bearer, and consequently not largely grown.

CHARLOTTE ROTHSCHILD.—A pine of great promise; growth erect; of very dwarf habit; fruit large, and evidently an improvement on Ripley Queen, and likely to be the pine of the future. There are a few other unimportant varieties in cultivation, such as Black Jamaica, Black Antigua, Enville, Black Prince, Montserrat, Prickly Cayenne and Prince Albert.

ARROWROOT CULTIVATION AND MANUFACTURING IN QUEENSLAND.

ARROWROOT is prepared from two species of plants which thrive remarkably well in Queensland, designated in botany *Maranta Arundinacea* and *Canna Edulis*. The first-named thrives best in sandy loamy soils, and attains the height of about two feet, bearing at maturity a small white flower something similar to the blossom of the potato. The arrowroot is prepared from tubers which cluster around the roots of the plant, and are from 3 to 8 inches in length and about one inch or an inch and a-half in diameter. This kind is the same as is produced in the Bermudas, but owing to the difficulty of manufacture its cultivation is now almost abandoned in Queensland. The *Canna Edulis*, or purple variety, is now commonly grown, and has been found to thrive well, on the alluvial scrub lands on the banks of various rivers from the Brisbane to the Endeavour, including nearly the whole Eastern seaboard of the Colony. The stalks of this kind sometimes grow to the height of 8 feet and bear a scarlet flower, which is followed by a small seed-pod, but the seeds very seldom come to maturity. It is propagated by planting one of the smaller bulbs found growing at the bottom of the stems.

Mode of Cultivation.—If the portion of land to be planted is cleared of trees, it is ploughed in ridges of about 46 feet wide and thoroughly pulverised with harrow and scuffler; this will give room for nine rows 5 feet apart, leaving 6 feet for the row in which the by-furrow comes. Shallow furrows or drills 5 inches deep are run with the plough, and bulbs of about the size of a small apple are placed 4 feet 6 inches apart in the drill, and then covered by turning a furrow from each side on to the top of the bulbs. After-cultivation is carried on by keeping it clear of weeds by means of horse-hoes or scufflers. When it reaches the

height of about 3 feet the space between the rows should be turned up with a one-horse plough, throwing the soil towards the plant and leaving a furrow in the middle. Nothing then remains to be done until it is dug up for manufacture. When new scrub land is intended to be planted the scrub is felled and burnt off, and the arrowroot planted in rows 5 feet apart amongst the stumps, a hole being made with a mattock 6 inches deep, the bulb placed in it and covered up, and then kept clear of weeds by frequent hoeing. The time for planting extends from the end of August to the beginning of January.

Manufacturing.—The article of commerce is manufactured from the tubers or root stocks found adhering to the stalks of the plant on the surface of the ground; sometimes upwards of 50 lbs. weight being obtained from one plant. The season for manufacture begins in July, and should close about the end of October, as by that time the root stocks burst forth and grow vigorously; and as the new plant grows to the same extent, the arrowroot becomes deficient in quantity and quality.

Mode of preparing the Roots for the Mill.—When the tubers have come to maturity, which is usually about nine or ten months after planting, the stalks of the plant are cut off as close as possible to the tubers with a cane knife or strong reaping hook. They are then raised with a grubbing hoe or mattock, and boys are employed separating them, care being taken to knock off all the soil adhering to them. They are then thrown into carts or wagons to be conveyed to the mill while quite fresh, as the colour of the manufactured article will be seriously affected if the bulbs are allowed to remain exposed to the sun and weather before being ground up.

Machinery.—A six-horse power engine will be required to work an arrowroot mill capable of turning out a ton of arrowroot per diem; other machinery needed will be a root-washer, grinding mill, cylinder, sieves for separating the farina from the pulp and fibre, and a centrifugal for drying. The root-washer is a trough 10 feet long, 3 feet deep, and 2 feet in diameter, having a half-circular bottom through which a stream of water is constantly

running. A spinder having pegs placed 4 inches apart of sufficient length to reach within an inch of the bottom and sides of the trough, revolving in a horizontal position, the pegs working amongst the bulbs thrown into the trough, thoroughly cleanses it of all dirt, at the same time forcing the bulbs to the end of the trough, where a wooden rake is so fixed as to push the bulbs out of the trough as they come to it into an elevator, which delivers them into the hopper of the mill. The mill or grinder is a wooden drum 2 feet 6 inches wide on the face, and 2 feet in diameter, covered with a sheet of galvanised iron punched and so placed on the drum as to show the burr on the outside. This drum, revolving at a great speed, and having a stream of water falling on it from tanks fixed above it, grates up the bulbs as they fall into the hopper, the pulp and water passing through into sieve No. 1; this is a cylinder 8 feet long, having the bottom half perforated with holes about the size of a No 7 wire nail; a beater revolves within the sieve, which forces the farina and water through the perforations—the beater being somewhat of a screw forces the pulp and fibre out of the end. The farina and water falling into sieve No. 2—a similar one to No. 1, with the bottom of perforated copper, having holes a little larger than a pin—the process is repeated. After passing through sieve No. 2, it runs along a trough 2 feet wide and 6 inches deep and 70 feet long, set to a dead level, the farina depositing on the bottom of the trough as the water runs away. The farina settled at the bottom of the trough is dug out, passed through sundry sieves, and washings by hand, in tubs, is again left to subside. When sufficiently firm it is dug out, and passed through a centrifugal to drive all the water from it, and is conveyed to a place away from dust and smoke, to be dried in the sun.

The mode of drying after it comes from the centrifugal is by spreading it on calico laid upon marsupial netting stretched and fastened upon wooden frames, 2 feet 6 inches from the ground; by this means the wind dries from underneath as well as the sun above. It is not advisable to trust to the sun alone for drying, as sometimes a succession of cloudy or showery days will cause the arrowroot to go

sour before it is dry, and thus become unsaleable. A drying house should be erected capable of holding about 3 tons of arrowroot in case of unfavourable weather.

As the value of arrowroot depends so much upon the colour and quality, the greatest care should be exercised during the whole process of manufacture, and the clearest water used in washing it. Sometimes hand mills are used for making small quantities for home consumption. The quantity produced from an acre of land varies from 15 cwt. to 30 cwt. The principal establishments for the manufacture of this article are in the Brisbane, Logan, and Coomera districts, producing 600,000 lbs. per annum, of which about 450,000 lbs. is exported.

SAMUEL GRIMES,
Coomera.

THE APPLE IN QUEENSLAND.

THE apple appears to have the widest range of all the fruits cultivated by man. In the temperate regions of Europe, Asia, and America, it finds a home. In the southern colonies of Australasia almost all the best varieties of Europe and America have been tried. Many have proved to be as good as in their native place, some have even improved in texture and appearance by the change, while new and good kinds raised from seed in these colonies are constantly appearing. Some of the earlier farmers and fruitgrowers of Queensland have also experimented with this serviceable fruit, and considerable enterprise has been exhibited in introducing from all sources promising sorts, especially from the warmer regions of North America. Many of the most desirable of these varieties have been distributed throughout the other Australian Colonies and in several districts of our own and the experience thus gained we will endeavour to set down for the guidance of those who may be new to the conditions which affect the growth of this valuable fruit in Queensland.

On our high lands, especially in the southern part of the colony—as, for instance, the country from Toowoomba to Stanthorpe—the apple is at home, and a judicious selection of good and marketable fruit could easily be made, with every hope of success. In our coast country, from the Main Range to the sea, the selection would be more limited, and would be largely confined to the Southern American sorts, together with some of the earlier kinds from more temperate regions, as apples which ripen in late autumn and winter in the temperate zone are rarely successful here. In the northern portion of the colony it is only in the high lands, and with a limited selection of kinds, that the attempt could be made with any probability of success. The American apples from Georgia and other southern states of North America—which are especially

recommended to the notice of Queensland fruitgrowers, and which were introduced into Queensland in the first instance—have been very widely distributed since in all the southern colonies and in New Zealand, winning highest place in all.

The apple is not subject to many diseases, the principal that have been noticed being the canker and the woolly aphis on the tree, and the “fly” and the “black spot” on the fruit. The woolly aphis is an insect which is covered with such a coat of cottony material that an infected tree looks as if it were covered with patches of cotton wool. On pressing these patches the insects are crushed, leaving a reddish stain on the fingers. The canker, as we have observed it here, is generally caused by cutting out large branches which are crowding the heart of the tree. The wound, although covered by shellac solution, is so large that the bark does not soon cover it, and it gradually turns black and decays. The black spot on the fruit appears to be caused by a deficiency of lime or potash in the soil, as affected trees have been noticeably improved by liming and manuring the orchard. The flies, which pierce the fruit, causing exudation of gum, premature ripening and decay, affect old and neglected rather than new and clean places. All fruits that drop from the tree should be removed for the pigs and poultry, to prevent the propagation of these pests. Burning of weeds to the windward of the orchard, causing a smouldering, smoking fire, will drive away the flies when they come on their destructive mission; but the knowledge of the habit of these unwelcome visitors is yet in its infancy, and the observant cultivator has herein an ample field for the exercise of his powers. *Woolly Aphis*—“Prevention is better than cure”: All apples should be grafted or budded on *blight-proof stocks*. The junction of the graft and stock should be clear of the ground, so that if the tree should be attacked the insect would find no retreat on the roots or the stem underground. If the head becomes infected it must be at once washed with tobacco water or a solution of soap and kerosine. This must be repeated on the least reappearance of the plague, as the insect, once in possession, increases with amazing rapidity. *Canker*—Prevention here, also, is best: Give the permanent shape to your tree when young, *i.e.*, the first year. Do not allow any vigorous shoot

to grow where it will ultimately be in the way. If this is neglected it is better to let it remain than to cut it out and make a large wound, which will probably prove an inlet of disease. If it must be cut out then cover the wound with a solution of shellac in methylated spirits (French polish) and make a plaster of old cow-dung and earth, to cover it until new bark is formed over it.

PROPAGATION.—This, we repeat, should be always on *blight-proof stocks*. There are certain apples which are *blight-proof*—that is, the woolly aphis cannot live upon them. These stocks can be obtained by throwing a blight-proof tree and then layering the branches. But this process is very slow, and cuttings are very uncertain in striking, so the Victorian pomologists hit upon the plan of inserting a fibre of root in the lower part of every cutting, which stimulated a ready and abundant production of roots, so much so that the cuttings were often budded the same season. But propagation on blight-proof stocks is carried on so largely that it is best for the orchardist to obtain his trees from some reliable nurseryman ready worked. The following are some of the best blight-proof stocks, the first and second being the most used :—Northern Spy, Winter Majebin, Irish Peach, Hocking's Greening, and some local blight-proof crabs.

PLANTING AND TRAINING.—Our experience points to a distance of 14 or 15 feet from tree to tree, some sorts requiring more room than others. Plough, subsoil and drain the piece of land before commencing to plant. Set the trees in straight lines, so that cultivation may be performed by horse labour. Do not plant opposite each other in neighbouring rows, but in what is called "quincunx" fashion. Dig the holes 4 or 5 feet in diameter; mix some decomposed manure or good surface soil with the loose mould in the hole, raising the centre 3 or 4 inches higher than the sides; place the tree in the middle, spreading the roots straight out to the edge of the hole, so that they pretty evenly occupy the space. Then gradually scatter in the best finely powdered soil you can get, nearly filling the hole and leaving a little hollow round the tree stem; pour in gently half-a-bucketful of water into this hollow, and by-and-by, when thoroughly absorbed, scatter a little more earth and fill up next day. The object in planting

is to get every root and rootlet surrounded by earth ; the water packs the earth compactly about the roots, besides affording the necessary moisture to start root action at once. It is necessary, also, in planting to remember that the soil (and the tree with it) will sink ; and as it is not desirable that the tree should be set deeper than it stood in the nursery, allowance must be made for this sinking. Taking pains in planting is labour very well spent. All bruised and broken ends to roots should be cut with a sharp knife and a clean cut, which will more quickly heal and push out new roots. Do not allow the roots to dry before or during planting. Choose one-year old (maiden) trees, with one stem if possible ; cut off the top, leaving a stem only about 2 feet in height. This is necessary—the old English system of stems 6 feet high is destructive to trees in our climate, producing hide-bound, sunburnt trunks, ensuring failure. Encourage three or five branches to start from this low stem, training the future tree in a vase or bowl shape. A rough hay-band of straw or grass loosely wound around the stem below the branches will protect the trunk until it is shaded by the foliage. During the summer growth, if shoots are too crowded or growing too vigorously, they may be removed or stopped by pinching, anticipating much of the winter pruning, and diverting the energies of the tree into permanent growth. In the winter, when the leaves have fallen—say in June—the branches, if the growth has been at all vigorous, will need a pretty sharp cutting back, especially if the summer stopping has been neglected. Thus treated the young tree will develop well below and produce plenty of foliage to shade both wood and fruit ; otherwise, in our warm climate, there is a strong tendency to run away to top, such as we see in many of the scraggy ill-conditioned peach-trees that disfigure some of our back yards. Perhaps it may be as well to suggest here the importance of clean cultivation and friable condition of soil, especially the first four or five years after planting. If crops are grown between the rows, we must take care not to rob the trees. The roots will extend on every side as great a distance from the stem as the height of the tree. If a tree is 6 feet high its roots will run 6 feet from the trunk, or 12 feet across. Briefly, it must be borne in mind, that it will injure the trees to grow crops where they

will trench upon the province of the tree roots. An occasional top-dressing of lime will be found beneficial. All bones should be saved, broken if possible, and mixed with the manure heap. The fermentation of the manure reduces the bones, and the mixture is eminently suitable for an orchard.

Hints and Recapitulation.

1. Thoroughly drain and subsoil before planting.
2. Plant early—say end of May—that the young roots may take possession of the soil before the heat of summer.
3. Never allow the roots to dry, between the nursery and their final resting-place.
4. Prune the tree to a height of 2 feet, and cut clean all bruised and broken roots.
5. Spread the roots well out in planting and allow for sinking of soil.
6. Tie the young tree to a stout stake, to prevent it being blown about by the wind.
7. Water during dry times in the first year, not the surface, but make a hole with the spade; pour the water therein. When well soaked away gently replace the soil.
8. Keep the cultivator going. Let the surface be “as fine as an onion bed.”
9. Shape the tree from the start. Don’t be afraid to prune.
10. Lime, bones, and cow manure are best and most wholesome for health of tree and soundness of fruit.
11. Thin the fruit if the clusters are dense, or the tree overbears. The remainder will pay you better.
12. Carefully pick and handle for market. Put as good fruit at the bottom of the package as on the top, have your own brand on the cases, and you will get good prices even in a “glut.”

List of Blight-proof Apples suitable for all Queensland Apple Districts, Coast and Upland.

- | | | | |
|--|-----|-----|---------|
| 1. Devonshire Quarrenden | ... | ... | 2 D. S. |
| 2. Hocking's Greening (?Green New-town Pippin) | ... | ... | 1 K. A. |
| 3. Hominy | ... | ... | 1 D. S. |
| 4. Mobb's Royal | ... | ... | 1 K. A. |
| 5. Irish Peach | ... | ... | 2 D. S. |
| 6. Jupp's Surprise | ... | ... | 2 D. S. |

7. Northern Spy	...	...	...	1 D. W.
8. Lord Wolseley	...	...	...	1 D. and K. W.
9. Stevenson's Winter	...	...	...	1 D. and K. W.
10. Summer Cheese	...	...	...	1 K. A.
11. Triomphe de Luxembourg	...	...	...	1 K. A.
12. Trivett's Seedling	...	...	...	2 D. and K. W.
13. Ward's Seedling	...	...	...	2 D. and K. A.

A good Collection—not so ready to blight as many other sorts.

1. A. and M. Summer Pearmain	...	...	...	1 D. S.
2. Ben Davis	...	...	...	2 K. W.
3. Buncombe	...	...	...	2 K. and D. W.
4. Bedfordshire Foundling	...	...	...	1 K. A.
5. Carolina Red June	...	...	...	2 D. S.
6. Carter's Blue	...	...	...	1 D. A.
7. Cellini	...	...	...	1 K. and D. A.
8. Equinetelee	...	...	...	1 D. A.
9. Early Strawberry	...	...	...	2 K. and D. S.
10. Family	...	...	...	2 K. and D. A.
11. Gladney's Red	...	...	...	2 D. W.
12. Horse	...	...	...	1 K. S.
13. Julien	...	...	...	2 D. S.
14. Kansa's Queen	...	...	...	1 D. S.
15. Jewett's Best	...	...	...	1 D. A.
16. Kittageskee	...	...	...	2 D. W.
17. Kentucky Red Streak	...	...	...	1 K. W.
18. Lord Suffield	...	...	...	1 K. S.
19. Late Wine	...	...	...	2 D. S.
20. Maiden's Blush	...	...	...	2 D. W.
21. Peasgood's Non-such	...	...	...	1 D. and K. A.
22. Rhode's Orange	...	...	...	1 D. and K. A.
23. Rome Beauty	...	...	...	1 K. and D. W.
24. Shockley	...	...	...	2 D. and K. W.
25. Stancill	...	...	...	1 K. W.
26. Twenty Ounce	...	...	...	1 K. W.
27. Stirling Castle	...	...	...	2 K. A.
28. Watson, Carolina	...	...	...	1 K. and D. A.

Abbreviations.—1, Large size; 2, Medium; 3, Small; D., Dessert-K., Kitchen; S., Summer; A., Autumn; W., Winter.)

J. W. CRIBB.

THE OLIVE.*

ALTHOUGH the olive is one of the most ancient of what may be termed commercial trees, the modern home of this plant is in France and Italy; it is also grown largely in Spain, Portugal, Greece, Syria, Turkey, and California. Some progress has already been made with the cultivation of the olive in Australia. It will be found from official returns that the area planted with olives in France is about 382,000 acres, and the annual average production of oil, valued at 6s. per gallon, is £2,442,616--equal to £6 8s. 3d. per acre. This value is for the oil alone, and does not include the value of olives preserved or used, and which added to the oil would probably raise the value to £7 per acre. In Italy there were, in 1882, 2,250,700 acres under olives, the annual average yield being from £8 to £10 per acre, but it is said that in their usual easy way the Italians do not attend diligently to the proper cultivation of the tree, otherwise the yield would be double.

The olive was first introduced into South Australia in November, 1844, by the South Australian Company, but at the present time Sir S. Davenport and Mr. W. R. Boothby, sheriff of the colony, are the most extensive manufacturers of oil in that colony. Sir S. Davenport has about 1,500 trees in full bearing, the picking of which is done by women and children, who are paid at the rate of 2s. 6d. per cwt., and are thus enabled to make good wages. A hundred-weight of olives produces in South Australia two gallons of oil, for which there is a full demand at from 8s. to 10s. per gallon, according to quality.

The olive is grown also in the Australian colony of Victoria, but up to the present time little oil has been manufactured except at the experimental farm at Dookie. The berries are used to some extent in feeding pigs and poultry, who get extremely fond of them, and it is said that bacon made of olive-fed pigs has a very pleasant flavour.

* Notes on the Olive and its Culture, extracted by permission from a Lecture delivered at Dookie, Victoria, by J. L. Thompson, Esquire.

The olives at Dookie were brought from France in 1879, and on the voyage out were packed in boxes with the truncheons wrapped in damp moss and covered with oil-paper. The first year they were planted in nursery rows, and not one of them failed to strike, and in the following year (1880) were removed from the nursery and planted out, since when their progress has been wonderful, considering that the olive is generally considered to be a slow grower. In most olive countries the tree does not as a rule bear until the tenth year, yet on this farm trees that were planted in 1880 have already borne fruit for three years. There are ten varieties of olives grown at Dookie, but the greater part belong to the *Olea Europea rubra*, red caillet olive, and *Olea polymorpha*, the weeping olive. The *Olea Europea rubra*, red caillet olive, is fairly large, roundish in form, with long brittle leaves drooping slightly. Its leaves are green and close banded towards the top. It buds, blossoms easily, and bears roundish oval fleshy fruit, with a short pedicel, of a dark red upon a greenish white ground, which it keeps until ripe. The oil of this tree is of a very good quality. *Olea polymorpha*, weeping olive tree:—Of all olives this is the most cultivated at Dookie. The tree there attains 32 feet in height. Its long branches, with thick foliage drooping down, distinguish it as much as its leaves, and its fruit is oblong, of a beautiful violet black, full of good oil, and which will keep longer than other oils. The crops, although alternate, are sometimes of great abundance. The other varieties are not likely to be grown in Queensland for some time, so that it is not necessary to enumerate them in the present paper. The value of olive growing to the Queensland farmer will be as an adjunct to his other productions. It is wise not to put one's "eggs all into one basket," and there is, perhaps, no part of the world where a greater variety of crops may be profitably grown than in Queensland. The olive is a healthy tree, not subject to diseases which would render its yield precarious, and possesses the advantage over other fruit-trees that it will not perish from neglect, and, unlike the vine, mulberry and other trees which, if neglected, come to no good, will revive as soon as the ground about it is stirred, and will respond again to the attention bestowed upon it by yielding as before; and again, when

the subject of the soil is discussed, it will be found that many a farmer who has sterile and barren land which he now thinks is utterly useless, can turn that land to good and profitable use by planting and cultivating this tree, which, to speak in metaphor, is of value and good all round, "from the sole of its foot to the top of its head." Another qualification of this wonderful tree is that once planted it is practically planted for all time. It attains an almost incredible age, and has been extensively cultivated for an unknown length of time; in fact it is described by an Italian authority as a "mine on the surface of the earth," and again an Italian proverb says, "If you want to leave a lasting inheritance to your children's children plant an olive." In olive countries the tree forms almost the entire support of the population, the present generation living with little trouble upon the fruits of the industry of their ancestors. When the farmer of Queensland knows that he can grow and manufacture on his own farm an oil which can be used largely for household purposes, for lighting his house, for making a very palatable preserved fruit, for lubricating his machinery, for making soft soap, and feeding pigs, cattle, and poultry, he will greatly regret that he has not before found this tree and grown it.

The popular belief that the olive is a slow-growing tree, and that it takes many years to come into bearing, must be greatly modified by the experience of modern growers. By being careful in selecting the variety to suit the climate, the olive has proved itself to begin producing as early as the orange, although it takes a few more years than the orange before reaching the limit of productiveness.

The planting of the olive differs little from that of any other tree. The land should be well worked and sub-soiled to at least fifteen inches in depth, the tree placed on well pulverised soil, and the finest soil placed round the roots. In planting the truncheons only about two inches should be left clear of the ground. When the fine soil has been filled in round the roots the tree should be taken hold of and given a slight upward pull, which will give the roots a downward tendency. Twenty-four feet apart each way is a good distance for planting, but as the tree is a slow grower, green crops may be grown between the rows, but it is better that the trees should have full possession

of the soil. The soil should be kept free of weeds, and the oftener it is pulverised and turned up to the air, the more healthy and rapid will be the growth of all plant life. Weeds must have nourishment from the soil as well as other plants, and it is apparent to all that where weeds abound the plant food is divided between these and the crop you are trying to grow; hence failure. The olive will grow in almost any soil except in very heavy clay or low damp places. It thrives best in permeable soils rich in lime or potash, and sheltered from the prevailing wind. The olive can be propagated like other fruit-trees from seeds, layers, cuttings, suckers, &c.

The gathering of the olive is performed in three different ways—(1) By picking; (2) beating off the berries with long sticks or reeds; (3) allowing the berries to fall off the trees and then collecting them. The first method, although more costly, is the best; the second method is rough and decidedly injures the trees by breaking the young shoots; the third method is worst of all—is wasteful, slovenly, and where practised produces bad oil. To make good oil the fruit should be hand picked, ripe, and picked only on fine days.

There is some difference of opinion as to the proper time for harvesting the olive. Some say that the fruit should be picked before it is quite ripe, others that it should be over ripe; but there is a “happy medium” in all things, and common sense shows that the proper time to pick the olive is when it is well coloured and perfectly ripe. In France, where the best oil is made, it is customary to keep the olives in barns for about three weeks until they have undergone a sort of fermentation, which facilitates the extraction of the oil.

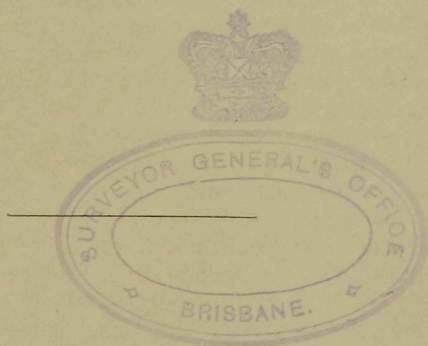
The extraction of the oil is carried on in one place in South Australia by the use of a common large corn-crusher, and in another by means of a Chilian mill—a powerful stone revolving upon a granite bed 7 tons in weight, and by which means the olive berries are thoroughly crushed before pressing. After passing through the crusher or mill the pulp is put into rice bags, as they are of stronger texture and more open than corn sacks, and pressed in a powerful press. At Dookie the berries are pressed before being crushed, and thus the finest of virgin

oil is obtained, and which is free from a taste that is imparted to the oil by the kernel after crushing. In France a sort of oil cake called "marc" is manufactured from the refuse of the crushing and is used for feeding pigs and poultry.

After pressing, the oil must be kept in clean vessels either of tin or earthenware, but in some places slate tanks are used. Time alone will complete the fining process, and in France it is sometimes six months before all the oil is obtained. It should be frequently racked off in a temperature of about 60 degrees. Before bottling it is passed through common chemist's filtering paper placed in an ordinary tin funnel.

Olives are preserved for table use in various ways. In their green state, when full grown, the fruit of those varieties that bear the largest berries are chosen. They are first steeped in lye made of wood ashes, and when the lye has penetrated through the pulp they are washed clean and put in brine composed of 1 lb. of salt to each gallon of water.

Like other trees the olive is subject to diseases, but the best way to prevent diseases in trees, as well as in man, is by keeping them well fed and in vigorous growth.



SILOS AND ENSILAGE.

THE silo system is not the new thing that many people are apt to think. It is on record that the ancient Romans used to store their fruits of the earth in great underground vaults, and it is a matter of history that the people of Central America have preserved their cattle food in this manner for centuries, and still do so. It would appear that attention to this matter was first called in the English-speaking world by the translation of a work written by Mr. A. Goffart, a member of the Central Agricultural Society of France, in 1879. In 1882, so great had been the stir made by this translation, that a conference of farmers of the United States was held in New York, to compare their various opinions; and the consensus of those opinions seems to point out that ensilage, properly cared for, will—(1) Double the stock-carrying capacity of farms; (2) will give cattle a healthy appearance not seen in grass or hay fed cattle; (3) will, by doubling the stock, increase the value of the farm; (4) will decrease the cost of keeping stock by about one-half—the cost of feeding on ensilage, as compared to hay, being as one part to three. Thus ensilage may be termed the sheet-anchor of the dairy farmer. The opinions referred to are not culled from mere theorists, but from practical experienced men, who make their living from off the land. If ensilage has proved so good in America, where they are not subject to periodical droughts, by how many times more may silos prove valuable in Queensland, especially in the closely settled districts around the large towns? In England, Scotland, and Ireland, silos have taken a great hold, there having been at the Smithfield Club cattle show in 1884 254 exhibits entered for competition, comprising almost every description of plant that could be placed in a silo.

* Extracted from a Paper on "Silos and Ensilage" by J. L. Thompson, Esquire, of Dookie, Victoria.

On a farm near Kenilworth, in Warwickshire, over 5,000 tons are preserved every year. So far as Australia is concerned, South Australia claims the honour of first introducing the silo, as it did that of the olive. As early as 1880, Mr. C. Rake, of Olive Farm, Enfield, South Australia, commenced preserving his green stuff by means of a silo, which he made by digging a deep pit on his farm, and putting his green stuff therein as quickly as it was cut and weighting it down. Six months afterwards this pit was opened, and, greatly to the wonder of the neighbouring farmers (who all predicted failure as a matter of course), the fodder came out in excellent condition—so good as to justify Mr. Rake in increasing his silos year by year, and placing him in a position to almost command the Adelaide market with his milk, cream, and butter. On Beefacre's farm, adjoining this farm, there is a silo constructed in four compartments, and costing £300 to build. Each compartment is 20 feet long, 12 feet wide, and 15 feet deep, having a total carrying capacity of 14,000 cubic feet, with a carrying capacity of 300 tons of green fodder.

In making a silo, local circumstances must to a great extent determine the nature of it. Where there is plenty of gravel and sharp river sand, a concrete wall is the best; one part of lime to four parts of sand will make really good walls. Eighteen inches in thickness is sufficient for the outside walls, but the division walls should be at least two feet; one-third of the silo to be above ground and two-thirds below. Doorways, as far down as the natural surface, should be provided, so as to facilitate the filling and emptying of the silo. The openings can be filled up with planks as the silo is being filled, and opened as it is emptied. The sides should be as smooth and as plumb as possible, to allow the ensilage and covering planks to go down as easily as possible, and the walls and bottom of the silo should be air and water tight. It makes no difference to the value of the ensilage whether the silo cost £20 or £500—one will preserve the ensilage as well as the other—the only thing required being continuous pressure. Cheap earthen silos are more likely to be popular amongst the farmers than expensive masonry ones, and where the ground is sound this can be adopted with perfect success, and no small farmer need hesitate to sink a hole

in any good holding ground, put in his ensilage, cover it up with two feet of earth, and expect to find it green and sweet when he uncovers again six or nine months afterwards. A great deal has been done by converting old barns and like buildings in England into silos, and with success.

There are two kinds of ensilage—sour and sweet. By the former it must not be understood that better ensilage is meant, but it is rather a name given to distinguish it from sweet ensilage. Sour ensilage has a pale greenish yellow colour and a slightly vinous odour, while sweet ensilage has a brown colour, with a sweet luscious odour. Sour ensilage has been found to be most suitable for animals producing milk, and sweet ensilage for fattening purposes. To produce sour ensilage the crop should be cut when full grown, but before any moisture has escaped, and carted to the silo directly it is cut, and pressed tightly down. The sooner the silo is filled and the pressure applied the better for the sour ensilage. If the crops are of a rough nature, such as barley, maize, &c., they should be passed through the chaff-cutter. When the silo is filled and weighted rapidly, the temperature will seldom exceed 80 degrees Fah., and little or no fermentation will take place. To produce sweet ensilage the crop should also be cut when full grown, but it should be allowed to lie a day or so before being put into the silo, so that the moisture does not exceed 75 per cent. of the original total. The process of filling the silo should go on slowly, so that the temperature may rise to about 125 degrees Fah. Should the temperature not reach to 125 degrees, either the crop has been too wet or the filling in and consequent compression has been going on too rapidly. When a sufficiently high temperature has been obtained, it should be immediately cooled down to below 90 degrees Fah. by applying the pressure, or the ensilage will rapidly spoil. The testing of the temperature of a silo can be carried out in a very simple manner, by driving 12 feet length of common inch gas-pipe into the centre of the silo, and lowering a common glass thermometer, by which means the temperature at different depths will be ascertained. A small piece of soft material at the bottom of the gas-pipe will probably save the thermometer from breaking.

In filling a silo the fodder should always be laid in horizontal layers. The filling having been completed the planks should be put the short way of the silo—9 feet by 2 feet will be found to be a convenient size; and in order to facilitate the escape of the air, by the compression placed on the silo, it is better to put the planks about a quarter of an inch apart, and half-an-inch shorter at each end than the silo itself, so that there will be no fear of them sticking to the walls. Any heavy matter will do for weighting the silo that can be procured—stones, concrete, blocks, earth put into bags, posts, &c.—so that a pressure of 200 lbs. to the superficial foot is placed on the silo, but among inventions for the weighting of silos, the chain and beam made by Messrs. T. W. Reynold and Co. are among the best. A chain is attached to the bottom of each side-wall by passing the end through the wall and securing by plate and bolt, the other end of the chain being thrown back over the top of the wall during filling. After the silo is filled a stout transverse beam is placed from end to end of the silo on the top of the covering boards. In the end of this beam brackets are fixed to carry moveable rollers, over which the ends of the chain from either side are laid. The chain tightener is now hooked into the links, and on turning the handle the ends of the chain are drawn closer together, causing the beam and covering of the silo to sink and so to press the material. Pins are supplied to enable a fresh pull to be taken on to the chain, or to secure it, and the tightener removed to another silo. Any number of beams may be used according to the size and pressure required. The whole covering can be removed in fifteen minutes. In using these screws a turn is required to be taken every day for about four days, when the pressure will be sufficient. The price of these screws and apparatus complete is about £30 in England.

In opening a silo only sufficient planks should be removed according to the daily amount of ensilage required for consumption and to give a sufficient room for cutting, and the ensilage will keep fairly good for more than a week after being removed from the silo. The cutting is done in the same way as hay-stack cutting is done—viz., vertically. The weights should not be removed from the uncut parts until absolutely necessary, and when the cut gets below

the surface a small block and tackle with a large basket is a good thing to use to raise the ensilage. When the silo is small and deep, and the consumption rapid, the whole of the covering may be removed, but when it is broad and shallow it would be unwise to attempt this. Any vegetation habitually fed by stock will make good ensilage—in fact, nothing comes amiss.

Ensilage has been preserved in England by simply stacking green in the open without any silo at all, and has turned out good. This has also been tried in South Australia, where a stack silo from fresh cut lucerne was preferred by a mob of bullocks to growing lucerne. The great objection to stack ensilage in this country, however, would be the penetrating power of the sun, which would destroy a quantity of the outer covering, and thus greatly diminish the profits. To illustrate the feeding power of ensilage, the dairy cows at Beefacre's, in South Australia, in January, 1884, were not averaging 2 gallons of milk a day, but a week after ensilage feeding was started, the yield increased to $2\frac{3}{4}$ gallons, and the butter made from the milk had the peculiar yellow tint which stamps good butter.

The Ensilage Commission of the Royal Agricultural Society of England sum up the advantages of ensilage under the following heads:—

- (1) In rendering the farmer independent of the weather in saving his crops;
- (2) In increasing the productive capabilities of farms;
- (3) In greater weight of forage saved;
- (4) In greater available variety and rotation of crops;
- (5) In increased facility for storing crops.

The commission in their report wind up by saying “that the chief advantages of ensilage-making against hay-making is its comparative independence of the weather; that the fodder is handled while green, without any risk of the tender and nutritious leaves being lost on the ground as in hay-making; that the resulting silage is succulent and palatable; and that on purely grazing farms it is possible to obtain a portion of the grass crop for winter in such a state as to equal the effect of summer-fed grass for the purposes of the dairy.”

VEGETABLE GARDENING IN QUEENSLAND.

To any intending colonist who purposes to make horticulture the means of gaining a livelihood, or as an addition to his income, by cultivating in his spare time a vegetable garden, a few hints regarding things suitable for culture in Queensland and their times and seasons may prove of service, and prevent disheartening failure.

With ordinary care and attention a degree of success may always be attained in kitchen-gardening, for there is no period of the year when a marketable crop of vegetables cannot be produced. One of the greatest difficulties the horticulturist here has to contend with is the frequent recurring dry seasons. Water storage should always be the first thought of the intending gardener, for without irrigation vegetable growing, except in very favourable seasons, can only be regarded as a failure from the start; so that in selecting the spot for a garden nearness to water is more to be considered than quality of soil, situation, &c.

To Start a Garden.—When the ground is cleared and fenced (a close paling fence is necessary to keep out vermin), the first thing to do is to thoroughly trench and drain the ground, no matter what the natural drainage may be or what the quality of the soil. Plenty of drains, 2 feet deep, will greatly improve its condition, and good honest trenching, 18 inches deep, will more than repay the labour expended.

Irrigation.—The next thing to be considered is how to irrigate. For this there are several methods now in vogue. For small capitalists the easiest and cheapest method of raising water to the requisite height is the American wind-mill, which is specially adapted for fixing on the banks of rivers, creeks, waterholes, or wells. The supply being determined on, the next question is how best to apply it. The easiest way is to plant in convenient beds and intersect with open ditches 6 inches deep. These ditches, filled and dammed at the extremity of each section, will percolate through the soil. The water can be conveyed along the higher part of the ground by a somewhat deeper ditch, with which the smaller intersecting ones can be connected; or it can be

conveyed to any desired spot by means of india-rubber piping, or piping made of well-oiled unbleached calico. There is still one other method of irrigation, namely, underground. This means of irrigation can be accomplished by leading the water from the highest part of the ground into small drains made of stones or logs, about 10 to 12 inches below the surface. These drains should be carried across the slope of the ground at intervals of 12 feet. This method not only irrigates, but has also a tendency to assist in keeping the soil sweet, and, moreover, prevents the surface of the soil from baking, which it does if the water is applied above ground.

Manure Heap.—This on no account must be neglected; all fertilising refuse must find its way there. There is a mistaken notion very prevalent that virgin soil requires no food or stimulus for some years after continual cropping. This is a mistake; and to this lack of sustenance in the soil may be traced the gradual decrease in the quantity and quality of crops, and also the development of disease, blight, and insect pests.

List of Seeds suitable for Cultivation in Queensland.

Artichoke—Globe and Jerusalem.

Asparagus.

Bean (Broad)—Beck's Gem, Brown's Longpod, Johnson's Wonderful, Taylor's Large.

Bean (French)—Early Dun, Negro, China, Canadian Wonder.

Bean (Runner)—Scarlet, Fiji or Snake, Golden Butter, White, Madagascar.

Beet—Blood Red, Waite's Black, Silver.

Brussels Sprouts—Continental, Scrymger's Giant, Mein's Victoria, Sutton's Matchless.

Broccoli—Grange's Early White, White Cape, Purple Cape.

Cabbage—Wheeler's Imperial Sugar Loaf, St. John's Day, Enfield Market, London Market, Drumhead, Red Pickling.

Carrot—Long Red, Attringham, Intermediate, Early Horn.

Cauliflower—Early Dwarf Erfurt, Early London, Large Asiatic.

- Celery—Cole's Red and White.
Chinese Cabbage—Pe-Tsai.
Corn Salad.
Cress—Fine Curled, American Land Watercress.
Cucumber—Long Prickly, Telegraph, Sutton's Champion, Barnett's Perfection, Stockwood.
Eschalot.
Egg Plant—White and Purple.
Endive—White Curled, Green Curled, Batavian.
Earth Nut, or Pea Nut.
Herbs—Sweet Basil, Fennel, Lavander, Horehound, Sweet Marjoram, Pot Marigold, Salsify, Sage, Thyme.
Horse Radish.
Kohl Rabi—Purple and Green.
Leek—London Flag, Musselburgh.
Lettuce (Cabbage)—Drumhead, All the Year Round, Hammersmith Hardy Green.
Lettuce (Cos)—White, Green, Bath.
Melon (Water)—All sorts do splendidly in summer.
Melon (Rock)—All kinds do well.
Mustard—White.
Okra—Long Green.
Onion—Tripoli, White Spanish, Brown Spanish, White Globe, Brown Globe.
Parsley—Double Curled.
Peas—Dan O'Rourke, Veitche's Perfection, Yorkshire Hero, American Wonder, McLean's Little Gem.
Pumpkin—Ironbark, Prince Albert, Rio, &c.
Radish—All sorts worth growing.
Rhubarb.
Sea Kale.
Spinach.
Turnip—White Stone, Red Stone, Orange Jelly, Waite's Eclipse.
Sweet Potato.
Tomatoes—All kinds do well.
Vegetable Marrows—All do remarkably well.
Yams.—These only succeed in the warmer districts.
Potatoes—So many varieties are now in cultivation that it is difficult to say which are best suited to Queensland. Preference should be given to kidney sorts

The proper times for raising the various descriptions of vegetables will be seen under the twelve months of the year, as follows:—

JANUARY.—This being one of the hottest months of the year the sowing and planting of vegetables is out of the question, except that a few rock melons and sugar maize may be sown. A row of French beans, sown, mulched and well watered, might yield fair results. A few rows of English potatoes may be planted for succession. Sweet potatoes may still be planted in the coast districts for late gathering. Water and rock melons will now be in full bearing.

FEBRUARY.—This month, like the previous one, is usually very hot, but frequent thunderstorms afford opportunity for sowings of cabbage, cauliflower, Brussels sprouts, savoy, kohlrabi, and lettuce. It is advisable to sow in boxes, and transplant later. Towards the end of the month full sowings of French and broad beans may be made in well prepared ground in drills 2 feet apart. Should the weather be dry a copious watering will be necessary. It is also advisable to mulch, that is, to cover the drills with a loose litter of straw or grass, strewn lightly on the surface, and which may be removed as soon as the plants appear above ground. A few onions, leeks, radish, endive, lettuce, and salsify may be sown sparingly. Celery may be sown in a specially prepared bed, or in a box for transplanting later. All vacant ground should now be thoroughly dug, and where practicable well manured, leaving the surface tolerably rough. Ground for celery may now be got in readiness by deeply trenching the patch where it is intended to grow it. A few rows of potatoes may still be planted in the coast districts. Carefully watch and cut down weeds, for if they are once allowed to seed the conditions for their development are so favourable that with neglect the best garden would soon become a veritable wilderness.

MARCH.—Now is the time to get in a full supply of nearly all kinds of "Old Country" vegetables. Cabbages, cauliflowers, Brussels sprouts, kohlrabi, savoy, and broccoli, should now be planted out if plants are procurable. If not, sow at once. In poor land plant thickly. If the soil be rich and deep, give plenty of room, else the crop will suffer.

Make full sowings of peas and broad beans. By putting in early and late varieties of the former, you will at one sowing be able to provide for a succession. Peas and beans love a rich soil. A sowing of French beans may be made for a late crop. Sow carrots, parsnips, turnips, beet, radish, lettuce, and salads of all kinds, and if there is a moist corner in the garden, sow or plant watercress; shade with a few branches, and water often. Divide plants of sage, sweet marjoram, thyme, and other pot herbs, and sow seeds of these for future crops. Parsley may be sown, and will require copious watering to start the seeds into growth. Once germinated the plants will grow freely. Liquid manure made from cow droppings makes a capital food for parsley, and is, in fact, very beneficial for all kinds of growing vegetables.

Celery may now be planted out in prepared beds and watered freely. Plant in single rows. Experience points to the fact that celery growing in Queensland is not an unqualified success, the winters being too mild. It lacks the crispness of the English-grown article, although the flavour is present. The English system of planting in deep trenches does not answer in Australia, the moisture and heat causing the plants to rot. The method adopted here is to remove the soil to the depth of, say, a foot and fill up with well-rotten dung or rich compost to within 4 inches of the surface. In this place the plants, water freely, and mulch heavily round the plants with straw, grass, or other litter, to which keep adding as they grow, until they are, say, 10 inches high, when the mulching may be removed and soil substituted. Again cover the surface with mulch, and keep adding as before until the plants are full grown, when they can be finally earthed up.

Asparagus beds may now be prepared. The ground should be trenched at least 2 feet deep, and heavily manured. It is customary to crowd this excellent vegetable into some waste corner of the garden, where, half starved and neglected, it gives a disappointing yield of useless heads. Yet asparagus responds most readily to liberal treatment. Select a patch, say, 8 feet wide and 15 to 20 feet long, trench as before mentioned, and divide into two beds, each 3 feet wide, with a two-foot path between; plant three rows of asparagus roots.

in each bed one row in the centre and the others about 10 inches from the outer edge, with a foot apart in the rows; mulch heavily with loose matter and water unsparingly.

Rhubarb may be planted in this month. The ground prepared for its reception should receive similar treatment to that intended for asparagus. The plants should be 5 feet between the rows, and 3 feet apart in the lines. Apply liquid manure freely. Eschalots and potato onions can also now be planted. Sow largely of onions and mulch until they germinate. Sow Globe artichokes in pots or boxes for planting out later.

APRIL.—Continue to sow and plant out cabbage, cauliflower, sprouts, savoy, kohl rabi, lettuce, also put in small sowings of seed. Sow onion, parsnip, carrot, turnip, and in the warmer localities, free from frost, plant a few potatoes; plant lettuce between rows of cabbages, cauliflowers, &c. This method greatly tends to reduce the ravages of the aphid or green fly. Should the weather continue dry, water freely and mulch all small growing crops. Keep an eye on the weeds, which, when hoed up, should be carefully collected and burnt. The English method of digging them into the ground should not be indulged in, as the seeds lie dormant for an indefinite period, and when the soil is again stirred up; they come with renewed vigour.

MAY.—Follow on with successional plantings of all kinds of European vegetables, except peas and beans; even they may be sown in the northern districts where there is no frost. Attend to all growing crops in the way of thinning, earthing up, hoeing, and use the fork freely, to prevent the surface from binding. Water freely in the mornings.

JUNE.—Continue to make sowings of lettuce, salads, carrots, parsnips, beet, onions, and transplant cabbages, cauliflower, savoys, kohl rabi; plant out Globe artichokes in deep rich soil, and shade them from the sun with a few branches till once they are established. Apply liquid manure liberally to asparagus, rhubarb, and onion beds, and keep the hoes vigorously at work.

JULY.—The garden should now be well stocked with a plentiful supply of vegetables, but as every square yard of ground becomes vacant, break it up and prepare for the next crop. A few cabbages may still be planted out in loose,

well-worked soil. Keep stirring the soil amongst growing crops. Rhubarb beds will require attention, as manure water which has been applied binds the soil. The free use of the fork will greatly assist the growth of the plants, but be careful not to disturb the roots. Asparagus beds will now require remulching. Shake up and thoroughly loosen all the surface, and add a liberal supply of fresh mulch all over the bed to a depth of, say, 8 inches. Radish, lettuce, and turnip seed may still be sown in small quantities.

AUGUST.—This is a busy time in the vegetable garden. All vacant ground must be deeply dug and thrown up roughly. Never use a rake at this time of the year; the rougher the surface of the ground the sweeter will be the soil; in fact rakes, except in extreme cases, should never be admissible in the kitchen garden.

SEPTEMBER.—Continue to plant potatoes. Cabbages may now be planted if water is handy. At this season the weather is usually dry. Peas and French beans may be sown in rich friable soil. The butter bean (runner) should now be sown in well prepared land. This bean being a runner, growing to a length of from 12 to 20 feet, requires plenty of room. The best method is to sow two parallel rows 3 feet apart, placing the seed 6 inches in the rows, which afterwards thin out to a foot to each plant. Place a long pole or sapling (always plenty to be got) with the point slanting towards the row opposite. When the poles are in position they present the appearance of an inverted V (thus: \wedge). Bring the tops together and slightly cross them and tie with wire. Along the fork thus formed lay a long sapling, tying each pair of uprights. This simple structure will withstand the high winds even when fully covered with the plant, and the yield of beans will be much greater than if grown on short branches close to the ground. It is no uncommon thing to gather beans from plants thus grown up to the end of January. They, however, must be irrigated occasionally. Cucumber, vegetable marrow, pumpkin, rock melons, and water melons should be sown about this time. Rock melons and cucumbers should be sown in boxes or pots and planted out later. Tomato, egg plant, and capsicum seed may also be sown in pots or boxes, as they transplant readily. Sugar-maize may also be sown

Towards the latter end of the month sweet potatoes should be planted. Cuttings from the tops instead of tubers are preferable if they can be had. Plant on ridges and water freely until they get a start. Every opportunity should be taken to dig up all vacant ground, into which may be put water and rock melons, pumpkins, Cape gooseberries, rosellas, tomatoes, and other tropical and sub-tropical plants. Keep stirring the surface of the ground often, and, above all, attend to cleanliness.

OCTOBER.—Continue to plant sweet potatoes and yams. Plant out cucumber and rock melon plants. Sow seeds of pumpkin, vegetable marrow, water melon, rock melon, custard marrow, sugar-maize and okra. A few radish and lettuce will succeed in a shady place. A few rows of potatoes will be of service, as will also be a row of peas, and also French beans. Keep the hoe at work.

NOVEMBER.—A few cabbages may still be planted, if water is at hand. Tomatoes may be planted; also seeds of cucumber, marrow, melon, pumpkin, sugar-maize, onion, and a few French beans may be sown. Another planting of sweet potatoes may still be made. Every bit of vacant land should now be thoroughly broken up, and left rough on the surface. The occasional showers and strong sun heat will shortly make it mellow and sweet. The disappointing results of many of our gardens are attributable to the neglect of this important matter.

DECEMBER.—The cultivation of European vegetables during this month can only be undertaken to a very limited extent; still a few radishes and sugar-maize may be sown, and a few more sweet potatoes planted. Show no mercy to weeds, which now grow quickly, and would soon overrun and utterly destroy all our work.

It may be necessary to add that the management of kitchen-gardening as above described is applicable to all that large portion of Queensland which lies south of Rockhampton, and where the mean external shade temperature is about 65·47. Horticulture in the more northern parts of the colony will be treated of in a separate pamphlet.

WM. SOUTTER.

ORANGE CULTIVATION IN QUEENSLAND.

THE subject of orange cultivation cannot be fully treated in a paper such as this. The writings on the subject are voluminous, and all that this paper attempts is to touch on a few of the essential points in its cultivation.

With regard to profit, that has been conclusively settled in the more southern Australian colonies satisfactorily, and the same favourable conditions are present in Queensland, especially in the southern part, along with the additional advantage of greater and more regular heat. Great as have been the profits from properly managed orangeries in the past, they are likely to be increased, by our increasing population, by the prospects of export at present under trial, and by the likelihood of the establishment of companies, as in the central sugar-mills now existing. By these means a constant and sure market will be no doubt created, not only for fruits of the orange family as dessert and for the manufacture of marmalade, but by economising the present deplorable waste of our orangeries in the shape of superfluous leaves, shoots, flowers, wind-fall and over-ripe fruit, which should all be utilised in the manufacture of oils, perfumes, and extracts. Of course the profits of all orangeries are not equal; they depend on a variety of causes, such as the original price of land, its situation, the cost of transit to market, the suitability of the soil, &c. The kinds of trees planted, whether seedlings or worked, and the consequent greater or less cost of working the ground before a return is realised are also to be taken into account. But in any case the cultivation of oranges properly managed is one of the most profitable industries of Southern Queensland, and, as before mentioned, is likely to be more profitable in future years.

Propagation, whether by seedlings or by grafting, is one of the most important considerations with regard to success. It is very important to thoroughly understand the matter before planting is done. The greatest failures in orange cultivation in Queensland have been due to grafted trees on unsuitable stocks having been so largely

planted. Seedling trees, even of good local kinds, are a little liable to be affected by inferior kinds growing near, and then not to come into profitable bearing condition in so short a time as grafted kinds. So, as the matter is one of results, planters have preferred generally hitherto to risk the method which yielded the quickest returns.

The seedlings are undoubtedly the most natural form of growth, are least liable to disease, make larger trees, and bear more heavily and to a greater age. As they require greater space to develop fully, and as it is undesirable for many reasons to plant any other fruits in an orangery, the distance between the trees and rows leaves too much ground unoccupied during the first few years of growth, and hence the cultivation of seedlings has been thought unprofitable. The better plan seems to be to combine the two systems, and plant with a view to the seedling trees forming the main crop after ten or fifteen years. For this end the seedlings should be planted not nearer than forty feet between the trees, and the rows thirty feet apart, the trees in each row to be planted alternately to those on each side of it. The grafted trees can then be planted in the intervening spaces, leaving, when finished, twenty feet by thirty between each tree. The grafted trees will come into bearing in about three or four years, and will have gone far to repay the cost of outlay and working expenses by the time the seedling trees come into full-bearing condition, when they can be removed to allow the full development of the seedlings.

It is not wise to crop ground in the early years with exhaustive crops. Such cropping interferes with the necessary working of the ground through which the roots will extend. The greatest care should be taken in the buying or raising of trees for a planting, of whatever size, that the seedlings used should be of the best kinds, and only those most suitable to the district, as it is disheartening to take the necessary pains and wait seven or eight years to find that the fruit is worthless. Especial care should be taken that the grafted trees are suitably worked as to scion and stock. As before stated, the greatest failures have been traced to a neglect in this matter. In

former years the lemon was largely used by nursery-men for grafting upon, because of its quick growth; but orange trees grafted on the lemon soon become unhealthy. The stocks thicken in greater proportion than the scion, showing a great inequality of tissue, the fluid channels of the one being larger than those of the other, and thus preventing the free circulation of sap from the roots, as essential in plant life as of the blood in the animal.

One of the best kinds of orange to sow for stocks is the "Seville," but it is very slow of growth. The best varieties for stock and scion must be determined locally—that is comparatively—as the varieties suitable to one district have been proved unsuitable to another. The most popular orange for dessert, on account of its sweetness and juicy nature, is the mandarin, of which there are many varieties grown. The lemon is always profitable, and the West Indian lime will no doubt come into demand for its many healthful properties.

The matter of reliable budding and grafting of orange and other fruit trees of proved suitability, is itself an industry well worthy the attention of good practical men. It is questionable if the present system of grafting the orange is the best—viz., by cleft grafting. The scion is fitted into the stock in the shape of a wedge, and as only the bark of the two adheres, the woody part of the wedge decays, and such decay, though small, may be the cause of future injury to health. Grafting by approach would at any rate obviate this danger.

Grafting by Approach or Whip-Grafting.—Grafting by approach or whip-grafting are the same as regards operations, with the exception that in approach-grafting, which is used for very choice kinds, the stock is in a pot, and the graft is made without severing the scion from the tree till the graft has taken. Whip-grafting is now generally adopted in English fruit-tree raising establishments. The scion, instead of being cut wedge-shaped, has only one side removed to half the thickness of the shoot and about two inches long. A corresponding cutting is made in the stock which is cut off on a level with the ground. The soil should be cleared away to the depth of three or four inches to allow of the work being cleanly done. If the thickness of scion and stock are equal, so

much the better, the bark will fit all round, but, if not, care should be taken that the bark of each should fit on one side, taking care to keep the cut surfaces thoroughly clean. They should be tied firmly in contact and rubbed over freely with a clayey composition, and the soil removed should be returned to cover the graft.

Compositions used in grafting are sold in tins; but clay forms a simple and effectual protection and is indispensable in successful grafting.

An intelligent examination of the proposed site of an orangery is necessary, as not only the nature of the soil, but also the lay of the ground as to natural drainage are very important factors with regard to success and profit. Flat ground should be avoided and a ridge if possible chosen for the purposes. Clayey soils, or those having a clayey subsoil, must not be used for orangeries, as the extra drainage necessary is a drawback, and any stagnation of moisture is injurious. The best soils are loams charged with sand or stones or volcanic soils, and ridges not too steep are the best situations, as they are more likely to drain naturally. Without good drainage, natural or artificial, orange growing cannot be a success.

The land should be marked off in lines where the trees are to be planted, from which line the plough should be started turning the soil on either side towards the centre, finishing midway between each row. Double ploughing should if possible be done. The centre of the ridge should be again ploughed in the same way and pulverised. Each successive ploughing should be towards the centre, to increase the ridge, and thus secure a sure escape of surface water. By running a drain along each furrow two or three feet deep, perfect drainage will be secured. In planting the trees great care should be taken in no way to disturb the ground lower than the plough has worked it; any hollows thus formed act as basins to hold the water in heavy rains, and the tree should not be planted any deeper than as it grew in the nursery. If the land is at all rich, it is best not to use manure when planting, but in some cases bones of about one inch in size may be used; in that size they give off their properties slowly. Feeding artificially in the young state of a tree always encourages a "sappy" development, which, in the vicissitudes of our climate, is

not so desirable as a slower and more natural growth. When the trees are in full bearing, manures are necessary to compensate for the heavy drain of cropping. Stock-yard manures are the safest, but, failing these, bone-dust sprinkled on the ground before rain acts almost instantaneously.

As the roots extend, they should be protected with a mulch of fern or grass litter. The advantages of a mulch are numerous. It keeps down weeds, and thus prevents the surface roots being disturbed in their eradication; it retains the moisture in the soil; it protects the surface roots from the strong sun, and checks the very rapid radiation of heat from the soil at night; it also keeps the top soil in a loose condition to be benefited by every shower, and thus prevents the caking of the soil after heavy rains, so injurious to the roots of trees.

Pruning, especially to any great extent, should not be required in a properly managed orangery. If the growth is not forced by manures or very rich soils, a healthy balance will be maintained by the drain of the crops. A judicious and intelligent system of pruning is, of course, beneficial. The head of the tree should be thinned, so as to allow of a free circulation of air and light, so necessary to health, but large limbs should be removed sparingly at one pruning. Of course limbs which cross and injure by friction should be removed, but in all cases these removals should be as near the growing stem as possible, to prevent any decay of wood setting in. All orange trees should be encouraged to grow near the ground, as thereby the roots are protected and a great saving of evaporation from the ground results.

The orange tree is liable to diseases, and pests the chief being the *coccidæ*, or scales of various shapes and sizes. They always infest the tree on the first symptoms of decay. Many plans have been recommended, but the use of "Gishurst's Compound," applied according to instructions on the box, is the safest and at the same time is sure. Kerosine in solution, boiling water, soft soap, etc., are recommended, but have disadvantages. The excrescence of all these insects covers the leaves with a black covering on which other parasites flourish, and the healthy action of the leaves in absorption and respiration is suspended.

The question of leaves and their uses is of more importance to the orange tree than is generally kept in mind. Trees are to be met with in moist and particularly favourable atmospheres, which contradict every known law of vegetable physiology as to soils and roots, yet bearing enormous crops, which can be attributed in no other way than that the healthy action of the leaves absorb from the atmosphere in a gaseous state all the requisite properties.

The study of orange culture deserves every possible attention, and although practical and local information is most important, yet the theoretical information of a standard work on the subject is of great value towards the thorough knowledge of the subject, and the application of common-sense theories.

As the cultivation of the orange in Australia extends, many improvements may be expected, for instance, in extending the season of fruit supply over a greater period, by a selection of late varieties, or by preserving the crops, by stacking in sand, in air and moisture proof pits or otherwise.

ALEX. M. COWAN.

THE MANUFACTURE OF BUTTER.

ONE of the most important products of the colony, and one for which there is great demand for home consumption, is butter. Its importance to the settler cannot be overrated, as with the aid of a few cows he is enabled to provide for his family the necessaries of life, while he is engaged in fencing, felling his timber, and getting his land into condition to give him a return. Many of those who have attained to positions of affluence can call to mind the time when they subsisted entirely upon the produce of a few cows. In no branch of industry in the colony is the result of want of knowledge more apparent. In no other way can we account for the large amount of inferior butter sent to market, especially in summer. The fact of such a large quantity of butter being sold in Brisbane at that time, realising from $2\frac{1}{2}$ d. to 6d. per pound, shows the want of care and management in the dairy. As a contrast to this state of things, it may not be generally known that many butter-makers, who exercise care and judgment, are, and have been, realising from 1s. 9d. to 2s. per pound for their butter all the year round, and have been doing so for years.

In a climate like that of Queensland, where the thermometer registers from 80 to 90 degrees on summer nights, it is an impossibility to make butter that will be marketable unless the dairyman can bring about such a change in the temperature of his dairy as will cause his thermometer to register not more than 65 degrees.

Butter may be made at a temperature of 68 or even 70 degrees, but it will be wanting in colour, and so soft that it will be impossible to separate the water sufficiently, with the result that it will become unfit for use in a few days, and probably will become unsaleable before it can be got to market. How many shopkeepers have to lament the loss sustained through their paying for an apparently good article, but which has gone bad in a day!

A good plan, and one which is adopted by many careful butter-makers to lower the temperature of the water used in butter-making, is to expose it in shallow pans overnight, with the result that the water is reduced from 6 to 10 degrees below the temperature of the water in the tank or in bulk. The temperature of the cream may also be reduced by the same means. Another good means of keeping the cream cool, after it is skimmed or separated, is by placing it in a large safe made with wooden frame and covered with canvas, which must be kept wet constantly. The evaporation causes the desired change in the temperature.

Above all things, cleanliness is the first and most important rule in connection with the dairy. Constant scalding with boiling water is necessary; all vessels used in connection with the dairy must be scalded before being used. Milk pails, milk pans, cream jars, churn, butter table, and butter-workers should be scalded effectually; no rinsing with lukewarm water, but a thorough cleansing with the water boiling hot in which soda has been melted. Failure in this respect is the cause of much deterioration in the quality of the butter produced.

The milk should be drawn from the cows by milkers with clean hands, who should have a vessel with clean water and a cloth always near to wash their hands after adjusting the leg-ropes, and if necessary to wash the cow's udder before milking. The defilement of the milk by any want of cleanliness at this stage renders it impossible to make clean and sweet butter.

The milking should be done carefully and completely; the udder thoroughly emptied. This is of importance, as the milk last drawn is incomparably the richest. The "fore-milk," or milk first drawn, is the poorest, having gravitated to the bottom of the milk glands, while the cream, being the lighter, floats on the top, and is consequently last drawn. Another reason for complete milking is, that if the udder is not milked clean the cow will soon cease to give any milk, and want of care in this respect will speedily dry the best milkers.

The large pail necessary for receiving the milk from the small pails used by the milkers should be hung up or fixed upon a shelf not less than 4 feet above the floor of

the cow-shed, so that it may not be injured by the odours arising therefrom, and should as soon as possible be removed to the dairy. Straining should be performed through two thicknesses of fine muslin, which should be well scalded before use.

Considerable difference of opinion exists as to the merits of deep and shallow setting. Each process has its admirers; but we think that where the dairyman has not the means of artificial cooling, the exposure of the large surface to the atmosphere, as in shallow setting, is preferable.

Whatever tends to separate the cream from the milk quickly, especially in warm weather, is beneficial. This may be materially assisted by pouring about a pint of cold water into each milk pan immediately after straining.

Many good butter-makers skim in hot weather after twelve hours' setting. Those who follow this practice make good butter at the expense of the yield, as the return is much smaller. Many others, who make equally good butter, do not skim under twenty-four hours. In winter, when the thermometer stands at 60 degrees and under, the cream will take from forty-eight to sixty hours to rise, and may even then be sweet. It is of the utmost importance that the dairy be well ventilated, and the atmosphere in the neighbourhood clear and sweet.

The dairyman should exercise care and discretion in the choice of a site for the dairy, which should be sufficiently removed from the piggery or the cesspits. Where this is not attended to, the wind coming from the direction of these parts of the premises affects the quality of the butter in a way for which the dairyman is often unable to account.

In making butter, the dairyman may follow either of two methods—first, by churning the whole of the milk and cream without skimming, as it is done by the majority of the small farmers in Ireland and Scotland; or by churning the cream only. The churning of the whole of the milk and cream without skimming is seldom resorted to in a country like this, where labour is expensive. The introduction of the cream separator has placed within the reach of those engaged in dairying on a large scale facilities for keeping the cream sweet until churned, and a corresponding benefit is derived by the keeping qualities of the butter. Where hand-skimming is resorted to, the

skimmer used should be perforated with fairly large holes and well scalded before using. The cream when skimmed should be carefully placed in the cream jar, and after adding salt, varying from a teaspoonful to the quart in cold weather to a tablespoonful in hot weather, the whole should be well stirred together, being careful that no spots of cream remain on the edges of the jar above the main body of the cream. When the evening's skimming is added to the cream skimmed in the morning after the addition of the salt required, the whole must be well stirred together and mixed, so that evenness of ripening may be secured. The best butter is produced where churning is performed every morning, the cream operated upon being that of the preceding morning and evening. The pattern of churn used is also a matter of choice. Every style has its admirers, from the primitive old upright churn, with its staff, to all manner of circular, cubical, revolving, and stationary varieties. Some of the best butter-makers pin their faith to the old upright churn, because, they say, "we can see every change as it occurs in the cream." Others choose the barrel churn, such as the "Hathaway" or its imitations. Others again choose the cubical revolving churn, and each in turn laud their own variety in proportion as it produces butter the most quickly. This, in our opinion, is a mistake. One of the best butter-makers we know insists upon the churning occupying a whole hour, and should the butter appear to be coming before that time, it is religiously kept back by cold water being added from time to time for that purpose. This idea may not be suitable to those who believe in labour-saving machinery, but in this instance the maker adheres to the primitive churn for the reasons above specified.

A very prolific cause of want of success in churning is in not attending to the reading of the thermometer. This is an indispensable instrument in the dairy. When commencing to churn the cream should be tested, and if the reading is above 64 degrees, steps should be taken to reduce the temperature to that figure at highest. If it can be reduced to 62 degrees it will be all the better. In cold weather the temperature must be raised by setting the churn in hot water. Where this cannot be done, hot water may be added to the cream with like effect.

In hot weather the addition of ice water to the cream, where ice can be obtained, is very beneficial, or, what is better still, by keeping the cream in the simple refrigerator previously mentioned. The churning must be continued until the butter assumes the size of grains of wheat, when the buttermilk should be drained off, and the granules covered with water mixed with salt, and made into a strong brine, which has been reduced in temperature, if possible, to 60 degrees, and allowed to stand for half-an-hour. If white specks or curds are apparent among the granules, a teaspoonful of carbonate of soda may be added for every three pounds of butter in the churn. Should the specks not disappear, and the brine not become white with the dissolving curds, a little more carbonate may be added, until the desired effect is obtained. The effect of this alkali is very beneficial, as it removes all acidity, and enhances the keeping qualities of the butter. The butter must now be washed in the churn by repeated additions of fresh cold water, taking care to keep the butter in its granular form until the last water comes away perfectly clear. The salt is now added, which should be well rolled, and be in the proportion of from half-an-ounce to an ounce and a quarter, according to the taste of the consumers. The dairymaid now removes the butter to the working table, and on no condition must she touch it with her hands; all the preceding washings having been performed in the churn by gently using the staff or other article necessary for that purpose, so as not to force the butter into a lump.

The butter having been removed to the table, she with her butter boards or pats, one in each hand, manipulates it until it becomes a solid lump. In this form it is left for three or four hours, until the salt is dissolved. When resuming her butter boards she continues her manipulation until all the water has been removed. Care must be taken not to overwork the butter, as it then assumes a greasy appearance.

The perfection of butter-making results in an article of fine waxy appearance, with a good grain, which is seen when the mass is broken.

Many varieties of butter-workers are now in the market. One of the best we have seen is of wood, conical in shape, and fluted longitudinally, revolving upon a table on

an axis fixed in the smaller end, and working in an eye fastened to the far side of the table. In every case the butter table should stand at such an inclination as will allow the brine to run off without difficulty. The packing of the butter for market is now the only operation. This, if done in a wooden tub or vessel, requires great care, as a tub once used retains, absorbed in the pores of the wood, the germs of decay, which will hasten putrefaction in succeeding packings.

This must be neutralised by the use of scalding water mixed with lime and washing soda, which must be allowed to stand in the vessel long enough to remedy the injurious tendencies. A good method of preparing new tubs is by covering the inside with a varnish composed of shellac dissolved in methylated spirits. A nice enamelled package is now produced in America which can be taken asunder, leaving the butter standing in a square block upon the counter of the storekeeper.

Other topics of interest in connection with the dairy I have been unable to touch upon owing to want of space, but equally interesting and important—viz., “Feed for Dairy Cattle,” “Selection of Dairy Cattle,” &c., &c.

W. CASTLES.

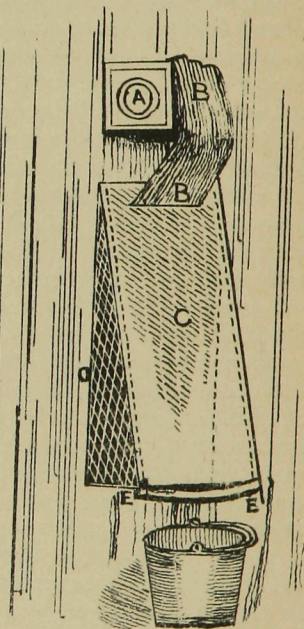
KEEPING THE DAIRY COOL.*

IF there is one thing more than another which puzzles the dairyman in Australia, it is the cooling of his dairy during the warm months of the year. There are many machines by which it can be done. For instance, the De Witt machine, shown in the working dairy of the Exhibition by Mr. Robert Hudson, will cool any apartment even without the aid of ice; or the farmer who sinks a long line of earthenware pipe, and brings the air through it to his dairy, either by forcing the air through with a fan, or simply by allowing it to be the only means of ventilation during the warmest part of the day, apertures being left in the roof for the escape of the warm air, and all the windows and doors being kept closed, will lower the temperature of the dairy materially. But the simplest plan, and the cheapest, is one which was suggested after trial by a New Zealand farmer many years ago. I will quote his own words, and illustrate the plan by the accompanying small engraving:—

“I must first give you to understand that my dairy is not a grand stone structure, with flagged floor; neither is it built of brick, nor is it dug out of the side of a hill; but, though simply made of timber, of the board and batten type of construction, and attached to the back part of my house, I will venture to declare that it is one of the coolest, if not the coolest, dairy in the Kaipara. Having made this particularly bold assertion, I will now endeavour to show, for the benefit of any of your readers who may like to try my plan, how it is that I dare to do so. To begin with, I must explain that I have covered the roof with sods, cut about eight inches thick, having, of course, first nailed on pieces of tin and zinc to prevent the boards from rotting. These sods I water with a syringe every other day, and I now have a nice crop of green grass grow-

* Copied from Mr. James P. Dowling's "Dairying in Australia," by permission of Messrs. Turner and Henderson, 16 Pitt street, Sydney.

ing, which effectually prevents the rays from the sun penetrating and heating the building as far as concerns the roof, which is the most important part to protect, as it receives the sun's rays at nearly a right angle during the hottest part of the day. At each end of my dairy I have a large opening or window, covered with perforated zinc to keep out flies and other insects, and at the same time to ensure a thorough draught. On the outside of these openings are stretched pieces of canvas nailed to tapering strips of wood, placed one on each side of the window. Above each window is fixed a kerosene tin, cut open on one side to allow of its being filled with water. In this receptacle I introduce one end of a piece of cloth, the other end hanging over the outside of the tin and touching the canvas blind, to which it is sewn in order to prevent it blowing about with the wind. Along the bottom of each canvas blind is a strip of tin, bent so as to form a gutter, and under the lowest part of this gutter stands a bucket. The apparatus being thus completed, the kerosene tins are filled with water, which being gradually absorbed and drawn up the cloth by the force known as capillary attraction drips down on the outside, and keeps the canvas blinds saturated with moisture. The evaporation from the film of water thus spread over the canvas covers produces cold, and the air, chilled by this means, enters the dairy



COOLING THE DAIRY.

- A. Kerosene tin. BB. Cloth, one end of which rests in water, the other on the canvas blind. C. Canvas blind. D. Tapering board to which blind is attached. EE. Gutter.

through the perforated zinc. A kerosene tin, filled with water, with cloth attached, will keep the canvas saturated for fifty hours without requiring any attention whatever, and at the end of that time all that is necessary to be done is to pour the water which has run into the buckets placed beneath the gutters back into the kerosene tins, adding, of course, the quantity lost by evaporation. By following the above instructions, anyone can secure a perfectly cool dairy or larder with very little trouble, and scarcely any appreciable expenditure. As a proof of the efficacy of the plan, I may say that I have kept meat perfectly fresh for five days during very hot weather."

This plan could be extended to any extent. The kerosene tins could be displaced by a larger reservoir, which could be fixed so as to supply several windows. Mr. J. L. Bruce, a very clever architect, when lecturing recently on "The Laws of Cooling," took this simple plan for his keynote, and said :—

"The suggestion and diagram are excellent, and the statements throughout scientifically reliable, as well as practical in the highest degree. The writer applies his notion only to his dairy, but it is of much wider application than that, and is suitable, with modifications, to every house in the colony. He cools the air going into his dairy, and absorbs heat from it out through the window as well by the cooling or heat-absorbing effect of a canvas blind kept constantly moist by suitable means, which he describes. Well, the greatest cooling effect ever observed in Sydney was on November 21, 1878, when the evaporation from our friend's dairy blind would have lowered the temperature $34\frac{1}{2}$ deg. There was a hot wind from the S.W. on that occasion, and the temperature in the shade was 102 deg.; but the temperature at our friend's dairy window would only have been 67 deg.; and if anyone were living in a canvas tent, and keeping the canvas damp on that day, he would be luxuriating in a temperature of 67 deg., and finding his clothes comfortable, while his fellow-men outside were sweltering in a temperature of 102 deg., finding even a coat intolerable, and almost convinced that there was no such thing as coolness in the world. From the meteorological tables published from the Observatory, I find that the hottest day of the year before last was the

5th of November. On that day the temperature in the sun was $154\frac{1}{2}$ deg., and in the shade $97\frac{1}{2}$ deg. From the state of the atmosphere as to dryness on that day, our friend's dairy window would have been some 23 deg. lower than the shade temperature, and those adopting this inexpensive and simple means of cooling would be enjoying a temperature of some 74 deg., while that outside in the shade was nearly 98 deg.; while the unfortunates in the sun were suffering 154 deg. Our dairy-cooling friend, however, uses and explains another means, to which I shall refer. He covered his dairy roof with turf, which he caused to grow with constant watering. Now this is a most ingenious idea, and combines within itself the obstruction of heat by an excellent non-conductor, and the abstraction of heat by an excellent evaporator. From experiments made on grass, bare earth, and water by the Government Astronomer, it was proved that the evaporation during the year from grass was 20 per cent. greater than from bare earth, and only 14 per cent. less than from water itself; but when the grass was moist on the surface the evaporation was considerably in excess of that from water even, and so the cooling effect produced correspondingly great. So much for the excellent cooling effect of the turf covering. I do not think it is generally known that at a certain depth below the surface the temperature never varies throughout the year, but remains at the mean annual temperature of the locality. This depth is least at the tropics, and increases as the difference of summer and winter temperature enlarges. In England it is about 30 feet down, and here, from tests made at the Observatory, it is probably between 20 feet and 30 feet from the surface. Now the mean annual temperature here is a little over 63 deg., and at this depth below the surface it is never hotter than that in summer and never colder in winter. We do not, however, require to go to this depth to derive very substantial cooling benefits from this material fact, for very small depths indeed produce most marked effects in reducing the variation of our surface temperatures. A box lowered to a depth of nineteen feet in a dry well would keep its contents at a temperature which would never rise above 67 deg. or fall below 63 deg., surely a point worth the trouble of lowering it down in a climate such as ours

here in summer. This evaporation, then, is the most simple and inexpensive method of cooling, and one which can be applied in many ways. For instance, most of us are, I dare say, familiar with the porous earthenware bottles so largely used in India. In these the cooling action is a reality, and is caused simply by the evaporation of the water, which percolates through the material and keeps the outer surface constantly damp. Canvas buckets or water-holders act exactly in the same way as the porous bottles.

FRUIT CULTURE.*

THERE is no other country in the world that offers so great facilities for fruit-growing as Southern Queensland. Thousands of acres are now lying idle which might be bought from the Government at a very low price. Much of this land is eminently adapted for fruit-growing, and much of it will, sooner or later, be utilised for that purpose. In no other of the Australian colonies can so great a variety of fruits be successfully grown as in Queensland, on account of the variation of its climate.

In the coastal districts, where little or no frost occurs, the following fruits thrive well:—Oranges, and all kinds of the citrus family, pine-apples, bananas, mangoes, Wild Goose Plum, Newman Plum, grapes, persimmons, custard apple, jack-fruit, loquats, guavas, pawpaw apple, passion-fruit of various kinds, peaches, apples, rockmelon, watermelon, &c.; and no fruits are here enumerated but such as are profitable to grow for market, leaving out all “fancy” fruits, such as the Brazillian Cherry, Natal Plum, &c., many such being enumerated by several writers, which only serve to mislead the would-be orchardist.

To anyone having the least acquaintance with fruit-growing it is needless to point out how desirable it is that a favourable site should be chosen on which to commence operations for forming an orchard; and I would strongly recommend anyone coming to Queensland with the intention of taking up land for fruit-growing purposes not to be in too great a hurry in deciding on the locality in which to settle until they have gained some knowledge of the colony. The best plan is to obtain employment during the first year's residence; and even if working for little more than rations the new-comer would be gaining experience that would be invaluable later when starting for himself. Also to use strict economy with regard to money, and place any spare capital in the Government Savings Bank for the time being, until knowing enough of the colony to be able use it with advantage.

* This paper on Fruit Culture is written specially for the information of new-comers intending to settle on the land.

In starting an orchard, of course, it is necessary that the clearing, fencing, and ploughing be first attended to. For any kind of fruit culture it goes without saying that the ground must be well drained, either naturally or by artificial means. After the land is stumped and cleared it is usual to break up the soil by means of a bullock team to the depth of about 12 inches. It is then cross-ploughed and harrowed, and the roots gathered up and burned, when it is ready for planting.

In orange culture the trees are generally planted 30 feet by 30 feet apart—forty-eight trees per acre. There is great variation of opinion as to whether seedlings or grafted plants are best. The difference is this: Seedling plants are less expensive, and everybody can raise seedlings for himself, and so save the expense of buying. Seedlings naturally grow strongest, and make the strongest and healthiest trees; but it is usually six to ten years before they fruit. The young seedling should be moved several times—at least three—in its young state. By so doing, and cutting back the long roots, a large mass of small fibrous roots is the result, which is certainly favourable to early fruiting. The finest trees in the colony are seedlings, growing within a short distance of where I am writing. These have been planted in their present position eleven years, and are therefore thirteen years old. They are 30 feet high, and of corresponding diameter. Last year the trees produced fruit to the value of £4 10s. per tree. The soil is red volcanic, manured with crushed bones, and mulched with sea-weed.

In the case of grafted trees being planted, care should be taken that none are on lemon stocks, it having been proved, beyond controversy, that however suitable lemon stocks may be in other countries they have proved an utter failure in Queensland. Seedling oranges should be used for stocks for grafting on, and in three years, if well cared for, they will produce a remunerative crop, increasing in value annually. With regard to varieties, it is best to ascertain the most suitable on the spot, as different varieties do best in different localities.

Pine-apple culture has, I know, been dealt with in a separate paper.

Bananas thrive best in rich scrub soil—that is, a soil containing a large amount of humus or vegetable matter, but they will grow well in any fairly rich soil. They are gross feeders. It is usual to plant about 300 plants per acre. Plants are suckers taken from old plants, and if put out in November or December will fruit in twelve months, producing one bunch each of from six to fifteen dozen, the bunches increasing in size as the plants get older. Several suckers will spring up around the parent, so that the second year two or three bunches will be cut from each stool. Bananas will stand from ten to twenty years, according to the care bestowed upon them.

Mangoes on good soil and in suitable positions grow very rapidly, and make exceedingly handsome trees. They are usually raised from seed. The seeds are large and are best planted where the trees are to grow, and in this way make the best trees. Care must be taken to get seeds of only good kinds, as the seedlings come very true. The mango is a fruit in demand, either for dessert in a raw state, or cooked while young and green, and it will become, like the pine-apple, a staple fruit for exportation to the South, where they will not grow, and on that account should have special attention.

Very few varieties of plums thrive well in the coastal districts*, none of the English varieties are successful. There are only two kinds that really grow and crop well, being two American varieties called Wild Goose Plum and Newman Plum. The former is a very handsome fruit, a small edition of Victoria; it produces fruit in abundance at three years old, as does also the Newman, which is very similar to Wild Goose, ripening about a fortnight later. Both of them are excellent for either kitchen use or dessert, and will consequently always find a market if grown in quantity. Neither of these plums succeeds well on its own roots, but should be worked on the peach stock.

Grapes grow and crop with a luxuriance that would surprise anyone who had not seen them outside of England. The fruit is of large size and excellent flavour. The

* Fruit culture on the elevated lands, such as the Darling Downs, where all the fruits of Northern Europe may be grown, is treated of in one of the other pamphlets of this series.

plants are raised from cuttings, and produce fruit the second year, with a good crop in the third. Mulching is an absolute necessity for all fruit trees. Grass, sea-weed, or vegetable matter of any kind, is used for the purpose.

Japanese persimmons are a splendid fruit, which have hitherto been very scarce, but are fast coming into general cultivation. The fruit will probably export well. The plants should be grafted ones. The tree is deciduous, falling the leaves in the winter months.

The custard apple is a handsome tree and delicious fruit. Seedlings are generally planted, which may be expected to bear fruit about the fourth year.

Peaches grow with the utmost luxuriance, and are almost a weed, as they spring up any where from chance seeds, and are consequently inferior to European kinds.

The apple does but indifferently. Occasionally fine fruit is grown, but the crop is not to be depended upon in the coastal districts of the colony.* The jack-fruit is a strong-growing umbrageous tree, usually fruiting at about eight years old. The fruit is larger than a man's head, of a disagreeable odour but fine flavour and highly appreciated when once the taste for it has been acquired. Plants are raised from seed.

Loquat: A handsome tree, usually raised from seed, produces fruit in abundance at five years old. It is an excellent tree for planting round orangeries, or any orchard requiring shelter from the wind.

Guavas, of which there are several kinds, are, like the peach, very common, producing an abundance of fruit.

The pawpaw is a diœcious plant raised from seed and fruits the second year. The fruit is as large as a moderate sized rockmelon, which it somewhat resembles both in appearance and flavour. All these fruits thrive under ordinary orchard culture.

All the foregoing fruits are profitably cultivated on the coast, but as we get further from the sea and into higher altitudes, the tropical and sub-tropical fruits will not thrive, but other kinds take their place, such as apples, pears, apricots, nectarines—in fact all the fruits that are usually grown in Europe. The northern and eastern slopes

* Apple Cultivation forms one of the papers of this series, and it will be seen that on the upland of the colony the apple is grown in perfection.

of the Main Range are particularly adaptable for orchard purposes. I never pass over them in the journey from Brisbane to Toowoomba without feeling convinced that we shall in the near future see all the available spots converted into vineyards, orangeries, and orchards generally. I have not had an opportunity of going over the land nor of examining the soil closely, but I know a great deal of it to be of volcanic origin, and the finest collection of oranges exhibited in Brisbane at the shows of the National Association have come from this district, exhibited by Messrs. Holmes, of Ballard's Camp, and Pentecost, of the Range, Toowoomba.

On the top of the Main Range is situated the town of Toowoomba, which has long been celebrated for its fruits, the principal being grapes, apples, pears, plums in variety, oranges, lemons, peaches, nectarines, apricots, almonds, and specimens of these may be seen at all the local shows that would not discredit any English show. I have also seen a splendid sample of olives grown in this district. Around and beyond Toowoomba there are literally thousands of acres of land inviting settlement.

Roma, famous for its magnificent grapes, is fast developing into a great wine-making district.

Around Warwick and Stanthorpe all the European fruits are grown to perfection; yet, in spite of these advantages, thousands of pounds' worth of fruit, both in a raw state and preserved as jam, &c., is annually imported from the South, Tasmania, and California, that might be equally well and profitably grown in Queensland.

In planting an orchard it is advisable not to plant it entirely with one kind of fruit, for if that crop fails—as all crops are liable to do for a season at some time or another—there would be no income. At the same time, the object to be aimed at by the orchardist is growing fruit for export, or in the case of fruits suitable for preserving, to grow them in such quantities as to be able to sell to the jam factories at reasonable rates; therefore I would recommend that the number of any fruit planted be not less than 50 trees, so that when they have grown to a size to produce a full crop, even if sold at a low rate, the crop would fetch a good round sum.

Having no other object in view in writing this paper beyond the wish to afford information to those intending to adopt fruit culture in Queensland as a means of livelihood, I would willingly give any further details or explanation desired with reference to anything I have herein stated.

JAMES PINK.

Wellington Point,
20th February, 1888.

THE WINE AND FRUIT TRADE WITH ENGLAND.

THE following extracts from the report of the New South Wales Commission for the Colonial and Indian Exhibition will be of interest to very many of our readers:—

“COLONIAL WINES.

“As an indication of the stimulus which the holding of the Colonial and Indian Exhibition gave to the colonial wine trade, the following extract from the Board of Trade returns, published March, 1887, showing imports of Australian wines for the three months ending 31st March, for the last three years, may prove of interest:—1885, 15,897 gallons; 1886, 38,610 gallons; 1887, 33,888 gallons. The large importation in 1886 was due to shipments sent forward in anticipation of the Colonial and Indian Exhibition, and a quantity quite equal to the excess of that year over 1885 remained in bond. On the other hand, the whole of the quantity landed in 1887 has gone into consumption on arrival; besides which duty has been paid during this period on more than 10,000 gallons of the wine bonded in February and March, 1886, thus bringing the consumption for the first three months of 1887 up to at least 45,000 gallons, or about three times the total importation for the first three months of 1885, *i.e.*, before the influence of the Colonial and Indian Exhibition had manifested itself.

“NEW SOUTH WALES FRUIT.

“The fruit which arrived in the Exhibition from this colony was not offered for sale, but was exhibited in the Court and at the Royal Horticultural Society's shows. Eleven cases of apples and quinces arrived in London at the end of May, the remainder of the fruit in August and September, and the passion fruit in October. All the fruit was stored in cold

chambers during transit, and, as a whole, arrived in good condition. The packing had been carefully attended to, and the appearance and quality of the fruit, with the exception of a consignment of oranges, was excellent. The apples arrived in fairly good condition, and were packed in chaff, which, being of a hygroscopic character, is a dangerous material for packing. Apples might form an important article of export; the rate of freight is, on an average, £16 per ton, or for cases of the size recommended (see Notes on packing), 8s. per case. The few samples of grapes arrived in good condition, each bunch being packed in its own box in a very fine and clean sawdust. Those shown at the horticultural shows were highly commended, and the Knighton medal was awarded for the whole collection of fruit. It might be considered whether the production of raisins and currants would not prove a profitable industry, as the climate of New South Wales would appear to be favourable for curing grapes. The oranges exhibited were of exceedingly handsome appearance, large in size, dark orange red in colour, and of superior quality. A vote of thanks was awarded for them at the horticultural show, the most conspicuous variety being the 'navel' orange. New South Wales oranges, coming in August, September, and October, arrive just before the Brazilian orange, but to judge from the first trial it seems scarcely probable that the sale will ever be of a very profitable nature. The prices obtained varied from 3s. to 8s. per case, the expense of freight being about 4s. Of shadd icks, the fruit exhibited was of medium size and good quality, and it would probably sell well in London, although more valuable for preserving purposes. The lemons were of ordinary appearance, but smaller than most of the South European fruit. Of passion fruit, most was on arrival in sound condition, though somewhat shrivelled in appearance. By careful packing in the methods proposed for peaches or grapes it would all arrive in good condition and sell well.

" SUGGESTIONS FOR PACKING FRUIT FOR EXPORT.

"The following suggestions for the packing of fruit for export are made by Mr. Gustavo Carsten., sen., late market superintendent, but now superintendent of the Royal Victoria Gardens, Bombay:—

"Apples intended for a long sea voyage should be gathered about a week previous to packing, and be most carefully handled, as the slightest blow is sure to leave a brown spot, and spoil the appearance of the fruit. After gathering, the fruit ought to be spread out in a single layer on perforated shelves in a cool and almost dark place. Before packing, every fruit should be thoroughly wiped with a clean linen cloth, as all fresh fruits are

liable to sweat. The packing cases ought to be manufactured of strong, not too porous, thin and light boards, simply nailed together. The size used for the first trial from Victoria—24 inches by 12 inches by 5 inches—will suit the purpose: but it is suggested that 20 inches by 15 inches by 6 inches would be a more suitable size, and would hold, say, 56 lbs. or ten to fifteen dozen, according to the size of the apples. At the bottom of the case and along the sides should be placed sheets of paper, lined with a thin layer of cotton wool or other soft material—hay and straw are unsuitable, being liable to decay by the influence of moisture—and then again sheets of paper. Every fruit should be wrapped up in tissue paper; they should then be placed in the case and pressed together as tightly as possible without injury. The layers of apples should be separated by double sheets of paper, and each successive layer pressed down. The last layer may be raised about $\frac{1}{4}$ inch above the margin of the case. A thin layer of cotton wool should be placed on the top, after which the lid may be nailed on. If necessary, the case can be secured by bolts of iron wire.

Pears: The above remarks apply to the gathering and packing of this fruit, though, considering its greater tenderness, more care, if possible, should be bestowed upon it. The choice of varieties for export must be restricted to good-keeping ones. The fruit should be gathered before it has ripened.

Peaches, Figs, and Date Plums: The fruit should be gathered before it is ripe. The cases should be small and flat (say 12 inches by 6 inches by 3 inches), and should be lined with tinfoil or parchment paper, in order to prevent the admission of moisture, and the fruit should be wrapped in tinfoil, and packed in cotton wool tightly enough to avoid friction.

Grapes: The best material for packing grapes is dry saw or cork dust. Care should be taken that the grapes are quite dry when picked, and that the packing is done in a cool and shady place in order to prevent a sudden change of temperature when the grapes are placed in the cold chamber. The most suitable size of case would probably be 10 inches by 10 inches by 6 inches, so as to allow of only two layers of grapes, and should be made of hardwood, be as tight as possible, and lined with tinfoil or parchment. The grapes should be handled with the utmost care; all damaged berries carefully cut away, so as to prevent damage to the bloom or any worse injury. They should not be wrapped in paper. The stalks should be sealed with grafting or sealing-wax.

Oranges: The fruit should be gathered when just commencing to change its green colour, but previous to the final process of ripening. It should be packed, like the apple, in cases of the same size; but it would be well to sort it in five different sizes—say ‘extra selected,’ ‘selected,’ ‘extra,’ ‘medium,’ and

‘small.’ In order to do this properly, it would be wise to adopt the same system as is followed in Sicily, *i.e.*, to sort the fruit by the aid of various sized rings. Bananas: Bananas reach the London market chiefly from Madeira, the Azores, and the West Indies. They are packed green, or half ripe, in open boxes or perforated barrels. Straw or wood shavings are used as packing material, and would answer the purpose very well for a short voyage. For long voyages the bunches should be cut when the single fruits have attained their full size, but are still quite green and hard. As with all unripe fruit, they should, during the voyage, be exposed as much as possible to air and light, and should therefore be kept on deck. Each bunch should be protected from injury by a cylindrical cage. Before packing the bunches the cut wound of the stalk should be sealed, in order to retain the sap. If sent ripe, the bananas should, in addition to sealing, be packed in saw or cork dust, or other soft material. Pine-apples should be packed as bananas. The cage-like packages above referred to should, however, be rectangular, and about 20 inches by 10 inches by 12 inches in size, so as to contain two sets of fruits. The packages should be divided into equal partitions, according to the size of the fruit, each cell containing one fruit hanging downwards, and properly fastened by ties. If packed ripe, trouble arises in consequence of the leaves being liable to decay. Storage in Cold Chambers: A few words may be added about storage in the cold chambers of the steamers. Though most of the consignments which have arrived in the market prove to have been carefully attended to in this respect, it happened that fruits in some of them were injured through being exposed to a too low temperature. As a rule most of the hardy fruits will without harm endure a temperature of from 26 degrees to 30 degrees, but a temperature of 32 degrees to 35 degrees will be safer, and a fall below 26 degrees will be likely to prove dangerous. In order to avoid any harm, care must be taken that the fruit on its arrival is not exposed to a sudden change of temperature, and the packages should not be undone until their contents are presumed to have acquired the temperature of the surrounding air. Any sudden change will induce the fruit to decay, or at least to lose its flavour.”—*Brisbane Courier*, 1st January, 1888.

PASTORAL FARMING.

IN a colony comprising such a vast area as Queensland, the variations in topographical features, geological formations, temperature, and climate are necessarily considerable. Each of these conditions exercises a potent influence on the pasture and, necessarily, also on the stock. Thus, while the rank indigenous vegetation in the humid climate of the coast watershed and in the tropical latitudes affords admirable pasturage for cattle and horses, it is unsuited for sheep. On the other hand, the fine salinous herbage in the drier climate of the interior provides sheep pasture not excelled in any other country.

The lands immediately to the west of the Main Coast Range, and for a considerable distance inland—intermediate between the Coast Range and the great saltbush plains—are admirably adapted to the growth of the finest merino wool, and it is on these western slopes that the highest quality of fine combing merino wool is grown.

Further westward, on the extensive plains, the pasture is of a highly nutritious nature, and there the sheep attain a greater weight of carcass. In addition to a variety of herbs of a saline nature, and therefore remarkably healthy as sheep pasture, the “Mitchell grass” (*Astrelia elymoides*), the most valuable fodder grass on the Australian continent, extends over a very large area of country available for settlement. Unlike ordinary grass the stalks of the Mitchell grass are perennial, and bud out afresh at every joint after every shower of rain, and it has therefore received the suggestive name of the “squatter’s stand-by.”

In consequence of the more arid nature of the climate, the western districts are not so favourable to the growth of fine soft wool as the country nearer to the seaboard, but the staple is of exceptional growth and soundness, and therefore a valuable description of wool for general purposes.

The whole of the colony is admirably adapted to the pasturage of cattle; but much of the open lands of the interior can with much greater profit be devoted to the growth of wool.

Circumstances will determine the description of sheep most suitable for particular localities. Thus on rich soils, with a good average rainfall, a strong, heavy, lustrous description of combing wool will give the best return; while on thin soil, and on broken or hilly country, a high-class fine clothing wool can be grown to best advantage. If the land is convenient to railway communication, and other circumstances are favourable, the breeding of crossbred sheep may be found more profitable than that of merinos. A cross between the English Lincoln and the merino produces a very valuable sheep, for which there is a great demand at the present time for fattening on the cultivated grasses of the coast and Darling Downs. This cross matures largely, and realises, when fat, 75 per cent. higher prices than the merino. The wool is a beautiful long lustrous staple, much sought after by English manufacturers, and commands at the present time as much per pound as a medium description of merino, while the fleece is considerably heavier than the latter.

There are many pure stud flocks within the colony, and stud sheep can be purchased at very reasonable prices. By far the larger proportion of cattle in the colony are of Durham or shorthorn origin. There are, however, many herds of Herefords, and a few of Devons. The shorthorn has been found to adapt itself to all districts of the colony. It is, however, the opinion of many that the Herefords and Devons are better adapted to the coast and mountainous districts. The Aberdeen-Angus black polled cattle have recently been introduced, and as butchers' cattle promise to be a very great success. All breeds of cattle, however, have answered so well in Queensland that preference for one breed over another would appear to be mere matter of fancy.

Of dairy breeds of cattle the Ayrshires are as yet the leading breed; but there are now several small herds of Channel Island breeds. The native Durhams, however, when selected and bred with that special object in view, have hitherto held their own as dairy cattle with any other variety.

The horse stock in the colony may be classed as follows:—Saddle horses, 56 per cent.; light harness horses, 39 per cent.; heavy draught, 4 per cent.; and blood or

thoroughbred horses, 1 per cent. There is a steady demand for good horses within the colony. Heavy draughts command remunerative prices for city dray-work and sugar plantations, and there is a constant demand for good weight-carrying saddle horses for Indian cavalry re-mounts. Heavy draught sires (Clydesdale, Shire, and Suffolk) and thoroughbred and roadster sires, suitable for getting saddle and light harness stock, are procurable in the colony at reasonable prices.

A grazing farm of 20,000 acres, if of good, unimproved indigenous pasture, will carry, in average seasons throughout the year, 8,000 sheep, or their equivalent in cattle—say, 1,300.

Where the land is favourably situated for the conservation of water, by the damming of natural watercourses or the excavation of tanks, or where underground supplies can be tapped by sinking or boring, the grazing capabilities of the country can be greatly increased. In many districts supplies of underground water are reached at a depth of from 25 to 40 feet, and raised for the use of stock by inexpensive windmills.

It is frequently the case in Queensland, as in the other colonies, that some of the best pasture lands are long distances from rivers and watercourses, and are therefore only available for occupation during wet seasons. Where water is procured by sinking, such lands are made permanently available.

Where the soil is suitable for the cultivation of lucerne (*Medicago sativa*), or Californian prairie grass (*Bromus unioloides*), and other valuable exotic fodder grasses, the grazing capabilities of the land can be increased to an enormous extent. On some of the rich alluvial flats and scrub lands in the Moreton district forty sheep to the acre have been fattened on those grasses during favourable summer months.

The average clip of merino wool per sheep is from 6 lbs. to 8 lbs., and the wages of shearers from 3s. 6d. to 4s. per score.

The annual increase of lambs from a flock of breeding ewes ranges from sixty to eighty, and under favourable circumstances 90 per cent.

The natural increase of cattle from a breeding herd ranges from 60 to 90 per cent; the general average over the whole of the colonies has been estimated by the Government statistician of New South Wales at 72 per cent.

Where a grazing farm is situated so as to command a ready market for fat stock, it may be worked to greater profit by purchasing and fattening store stock instead of breeding. Store sheep can be purchased after shearing at prices that will leave a fair margin of profit when sold as fat, and the same remark will apply to store cattle. Or it may be found more profitable to combine breeding with the purchase and fattening of store stock.

Good breeding ewes can be purchased at the present time at 10s., and superior flock rams at from £2 to £3; good heifers at from £2 10s. to £4, and superior herd bulls at from £10 to £15.

FENCING.

The Crown Lands Act provides that grazing farms shall be enclosed with a fence within three years from the date of first occupation.

Formerly sheep were shepherded in flocks of from one to two thousand in all the Australian colonies. This practice has been abandoned for many years, and shepherding is now a rare exception to the general rule. The benefits of grazing sheep at large, within fences, are many; among the principal of which may be mentioned increased growth and quality of wool, saving in wages, and a more healthy condition of the sheep. These, together with the greater number of sheep carried per acre, are sufficient to recoup the cost of fencing in a very few years.

The cost of fencing will vary with the description of fence adopted and the quality of the timber available. The best description of fence is wire with hardwood split or sawn posts. For sheep five wires are sufficient. The cost of No. 8 wire delivered in Brisbane is at the present time £12 per ton. A ton of this wire measures 11,460 yards, nearly $6\frac{1}{2}$ miles. Smaller wire is slightly dearer, but has the advantage of greater length per ton—thus No. 9 is £12 5s. per ton, of 13,600 yards (or $7\frac{2}{3}$ miles); and No. 10, £13 per ton, equal to 16,380 yards, or over $9\frac{1}{3}$ miles.

For cattle three wires—the centre one being of barbed wire—are sufficient. Barbed wire, thick-set, gives 4 cwt., and long-set $3\frac{1}{2}$ cwt. per mile.

Subdivision fences of same material need not be so high as boundary fences. With these the posts are usually a considerably longer distance apart, the wires in the interspaces being kept in place by battens, which, however, are not sunk in the ground. A fair estimate of the cost of such subdivision fences, with timber and railway carriage available, may be stated at from £16 to £21 per mile. Where the land is not open plain, cheap but efficient rustic subdivision fences may be constructed by unskilled bush labour.

There is probably no more healthy country for stock than Queensland. Sheep scab has never existed in the colony since it became separated from New South Wales. Footrot and fluke are unknown, except in a few isolated instances on the high lands, near the southern border. There have been a few cases of catarrhal fever, which have been promptly stamped out, and the owners compensated from a special fund.

Among cattle pleuro-pneumonia, an introduced disease, exists more or less, and frequently occasions considerable loss among travelling stock; but since its first introduction into the colony in 1864 it has assumed a much milder type than formerly. Anthrax occasionally appears, but the losses from that cause are very trivial. The climate of Queensland and the system of grazing in the open air all the year round seem inimical to many of the diseases in stock so common in European countries.

P. R. GORDON.

WHEAT-GROWING.

A NEWCOMER to Queensland inquiring concerning agriculture is informed that wheat cannot be grown on this side of the Main Range on account of rust destroying the crop before it arrives at maturity, but that on the highlands of Toowoomba and Warwick wheat is grown successfully in favourable years. Anyone sowing seed wheat brought from England, New Zealand, or Adelaide, on this side the Main Range finds the statement to be true, and that his wheat shoots into ear, but when about to form seed the whole plant becomes covered with little reddish streaks, which burst, giving out a dusty powder, and no grain to speak of develops. On cutting the straw the red dust flies about covering the workman's clothes, as is also the case with oats grown for fodder when the season is favourable to the growth of rust, or where the land is low and rich. No grain forms on the common oat as a rule, but the black hairy oats produce ripe seeds. Rye also perfects grain with little or no injury from rust. This was the extent of our information thirteen years ago, when a Board to investigate diseases of stock and plants was formed by the Government at the advice of Mr. Haly. This Board on inquiring into the cause of rust in wheat, by the advice of the writer sought for wheats grown in or near tropical latitudes. Wheats were known to grow with success in India, and these wheats were obtained and sowed; some of them were found to come into ear and make perfect grain on the low scrub lands near the coast, under the most adverse conditions.

At Toowoomba they were also tried in the public garden by the late Mr. Way, and several were found to give excellent results. The writer has continued to grow these wheats from year to year since then, but no mill being at hand in Brisbane, all who tried the same wheats were unable to have flour made from them. Recently Messrs Joyce, of Dalby, have at great pains taken the Indian

wheats in hand, and have found during the two past years that they grew satisfactorily. The Minister for Lands now purposes to distribute trial quantities grown by Messrs. Joyce to the farming community, and it is hoped that at no distant date a flour-mill may be constructed in Brisbane, so that the East Moreton farmers may have the opportunity of producing their own flour.

The two smaller sorts now distributed are beardless and resemble European wheats. They should be sowed on forest land, or on the upper and drier parts of scrub soil. In these places they produce grain uninjured by rust. On low rich scrub soil the larger Indian wheat may be sown. It grows five feet high and has a long black beard. Birds have little disposition to meddle with it. In no case does it suffer from rust, even when too rank or laid.

TIME OF SOWING.—May is the most convenient month in the neighbourhood of Brisbane. If sowed in April, the wheat may shoot into ear before the frosts are over and no grain will form.

If May is passed over, rain may not be sufficiently abundant to enable the grain to germinate, though if there be a satisfactory fall of rain in June the plant will grow to maturity and ripen in October, soon enough for the land to be ploughed and maize planted for a summer crop.

STORAGE OF SEED.—The preservation of seed wheat is a great difficulty in the coast country. The same applies to sorghum, millet, maize, barley, and rye. Rice, curiously enough, is not attacked by either the moth or the weevil, and may be stored from year to year if protected from mice.

To store wheat for sowing, pack the grain in bags that hold a bushel or less, and place on wire netting or other framework in the upper part of a smoky kitchen, under the shingles. The bags should be opened and the contents examined once a month, in case weevils develop in the centre of the bags where the smoke does not penetrate.

RUST.—Rust is a fungus, the mould of which lives in the green structure of the foliage of wheat, oats, barley, rye, and maize: in the two latter to a limited extent. The seed or spore-bearing part of the rust plant produces ridges on the

leaves and stems. Later on these ridges burst, giving out a red powder. The powder is scattered by the wind, and when it falls on the foliage of cereals that possess a downy surface it adheres. The rust spore soon throws out a minute thread of mould which penetrates the breathing apertures—the stomata—of the plant. The rust mould then no longer lives on the surface of the leaf, but develops its threadlike structure within the plant itself.

It has been found that cereals that have a smooth glassy or waxy bloom on their surface suffer least from rust, and that cereals that grow rapidly to maturity give little time for the rust fungus to injure them. The red powder of the rust, like the black powder that falls from the gills of a mushroom, may live in the soil for a long period, awaiting favourable opportunities for development. Long experience has shown farmers that the same plant should not be grown two years in succession on the same soil. All plants have their enemies of vegetable or animal kind, and to avoid the ravages of the enemies lying in the soil some fresh plant is substituted the following year the enemies of which may not be the same. Thus rotation of crops becomes an established usage in old farming countries.

It has been asserted by writers that Queensland being a country unsuitable to the growth of wheat gives little encouragement for the farmer to carry on agriculture on the European model, as he cannot rely on his wheat field to supply his family and assistants with bread. This is made much of by Trollope in his description of Queensland. It therefore behoves all patriotic men to try how far this defect can be remedied, and the path to successful farming made easy for their descendants. There are, probably, among the hundreds of varieties of wheat of India and Egypt, many sorts that could be successfully grown in Queensland, and the writer would recommend that from countries of the same parallel of latitude in which we live— 25° to 28° —in the northern hemisphere, the various useful cereals there grown should be obtained for experimental culture.

J. BANCROFT.

UNUSUALLY LARGE YIELD OF WHEAT REPORTED IN MARCH, 1888.

“Mr. Henry Allan, of Freestone Creek, has just finished threshing his this year's wheat with most satisfactory results. The wheat was sown in May last over an area of 108 acres; the yield is 938 bags or nearly 4,000 bushels—viz, 600 bags lamas, 140 purple straw, 101 bags tuscan, and the balance defiance. Mr. Allan expected a yield of about 650 bags only, and was therefore most agreeably surprised at the end of the threshing to be the lucky owner of 938 bags as fine and as dry a wheat as ever produced in the district, the wheat being remarkably clean, free from oats, smut, and other impurities. Mr. Allan is now engaged delivering the wheat into Mr. Kates' Warwick mill. It will take nearly 50 drays to do it, and when finally delivered he will receive the handsome cheque of over £750. The average yield is about 36 bushels to the acre; that shows what the district can produce with anything like a fair season”—*Argus*.

The above, published in the Brisbane paper in March, 1888, showing a yield of 36 bushels to the acre, must not be taken as any guide as to average yield in Queensland, as the season of 1887-8 was exceptionally favourable for wheat growing.

For information on the cultivation of wheat in Queensland, the reader is referred to what is said on this subject in the description of Queensland as a field for emigration, page of the Queensland Illustrated Guide, for the use of farmers, fruit growers, vigneron, and immigrants.

WHEAT GROWING ON THE MARANOA.

The following is taken from a lecture recently delivered by Mr. J. C. Minns, on wheat culture in Queensland, District of the Maranoa:—

“He had no fear of the future so far as the Maranoa and wheat growing were concerned. Well, gentlemen, now coming to the subject which has brought me here to-night: the position I take up is not that of a visionary or a dreamer. Our opponents speak of agriculture so far inland as impossible, but I maintain facts are against them. The same thing was said of some portions of Victoria, and it is no secret—in fact, a matter of history—that the first attempt to grow wheat on the plains of Adelaide was ridiculed. In those days the first settlers

imported all their bread-stuffs from Tasmania, and in the young city of that colony flour was sold at £100 per ton. The colony had only just recovered from one of those periodical droughts which are matters of history in Australia. What has been the result of the first efforts on wheat growing in that colony? South Australia is the great emporium of wheat cultivation in the Southern Hemisphere; over 2,000,000 acres was under this cereal, and this result of the year's harvest is bringing wealth and prosperity to the people. No one can doubt the fact that the conditions to successful wheat growing exist in that colony. And if it can be shown, and I maintain it can, that the same conditions obtain in Western Queensland, what is there to prevent this district becoming the greatest wheat producing centre in this northern colony. In the matter of rainfall—and let me say that wheat requires less moisture than any other cereal—the average of the Maranoa is fully two inches more than the wheat areas of South Australia. Perhaps the objectors will now admit that the district is not too dry. But let me state another condition—and I wish you to carefully note it—that the mean temperature is less in the Maranoa than where wheat is successfully grown in the neighbouring colony. But, beyond this, South Australia takes her prominent position to-day from fact that, added to other conditions, the soil is calcareous, and lime is one constituent element in first-class flour. Well, what are the facts so far as we are concerned? An analysis of the soil at Mitchell, Roma, and Yeulba shows the presence of large quantities of lime. These are the conditions to successful wheat growing. Well, what are the facts of history so far as the Maranoa is concerned? It is well-known that Mr. J. H. Irwin took several first prizes for wheat in the Roma shows during the years 1880-81-82. Gentlemen, I attach little or no importance to this, as the whole was of local growth. It is well-known that a great International show took place in Melbourne in the years 1881-82, and this is regarded as the greatest exhibition ever held in the Southern Hemisphere. The world's products were there. In these shows wheat from the whole of Australia, America, and I think Europe, was sent for competition. Well, now, what is the position so far as the Maranoa is concerned? Wheat grown by John Lines, near Roma, took second prize against the world. And more than that, gentlemen, wheat grown by another Roma selector, whose name I do not remember, took third prize. And yet we are told we are dreamers, and wheat will not grow in Western Queensland. The Mayor of Roma reaped 40 bushels to the acre at Hodgson last season. Upon this one point I may be an enthusiast, and I am not ashamed of my position. There is wealth for the people and prosperity for Queensland in the soil. There is nothing to

prevent the Maranoa becoming one amongst the great wheat producing centres in Australia. God has given you the conditions, and has placed everything to ensure success within your grasp. He can do no more. Be men of spirit, pluck, and enterprise, and make this the great and prosperous land Providence designs it should be."

The Government have recently consented to sell a suitable piece of land within the Railway Reserve in the town of Roma, Maranoa, on which Mr. Kates is erecting a flour mill, the farmers around having engaged to put about one thousand acres under crop in this first season.

RUST IN WHEAT.

EXTRACT from notes by "Christophus," published in the *Queenslander*, made on visit to the farm of Mr. Banks, Goomburra.

"The 'Defiance,' introduced some few years ago, the grain of which is of a lighter colour, and which is gradually getting acclimatised, is the wheat to which Mr. Banks now pins his faith. This year he reaped nearly 40 bushels per acre* of this variety, and the grain fetched full market quotations. Talking on the subject of feeding the crop down when it shows signs of super-luxuriance of growth, I found my host a thorough believer in the practice. Bullocks are, in his opinion, far better than sheep for the purpose. At Goomburra Station the wheat grew unusually rank last year, probably because the paddock had been smirched by the inundations of January, and a fresh deposit of alluvial soil laid, and to keep the crop down Mr. Banks turned in a mob of 300 bullocks. The bullocks were kept in a 22-acre paddock during most of the winter (being turned off at night), and fed it down quite bare. The result of the cropping and trampling on the wheat showed prominently about harvest time, the crop standing up straight and level, the straw being free from flag and unusually clear, and the stripper taking off about 300 bags from the paddock. I hinted that most small farmers had not a mob of 300 bullocks to turn in on their crop; but there is no doubt that, in cases when the wheat grows unusually rank when young, if farmers were to make a mob from the cattle off several holdings and feed down paddock by paddock it would prove a strong preventive to rust. Cattle will eat wheat when it is far too rank for sheep, and

* This was in 1887, when the wheat generally in Queensland was free from rust, and the yield was above the average.

the trampling does the crop all the good in the world, proving the truth of the saying that you 'cannot knock wheat about too much.' Mr. Banks holds strong theories about the rust scourge. In his opinion a great deal is due to the description of country wheat is grown in and the preponderance of iron in the soil. The formation all around here is basaltic, and at Glen Innes the same characteristic may be observed. At Glen Innes the rust scourge has been severely felt in past years, and doubtless will be again. About Tenterfield the country shows granite formation, and there rust is almost unknown. Mr. Banks informed me that whilst on a trip in that neighbourhood he was shown paddocks that have grown wheat for fourteen years consecutively without any devastation from rust. This fact might be worth the attention of our Agricultural Department."

FLOWER GARDENING.

THE full enjoyment of the possession of a home in any clime is incomplete without a flower garden, and in Queensland the varieties of climate are so great as to allow of the successful growth of flowers, varying in their nature from the annuals of an English garden to the rich growth and colours of the tropics. Besides, a flower garden can be gay and attractive during every month of the year. Queensland is known as the "Land of Sun and Light," and it rests with its settlers to make it a land of flowers. Hence no apology is necessary in urging on all new-comers the desirability of making their homes truly home-like and attractive. Though the altered circumstances of their new life may compel settlers to apply themselves almost exclusively to remunerative work at first, yet with a little of the enthusiasm and love of flowers which characterise the home countries a great deal may be accomplished with comparatively little labour in making homes attractive to the settlers themselves, their families, and the district generally.

The cultivation of flowers creates a healthy rivalry among families, promotes social intercourse, and the dissemination of information on all cultural matters such as is often acquired, it may be, through failures, and yet proves the most useful and practical information for the locality. Matters pertaining to home gardening may be the means of benefiting the children by engaging their attention and developing in them habits of usefulness, diligence and observation, which may be the basis of future instruction, and which, if encouraged, may be a safeguard in forming character. Local horticultural shows, too, encourage a desirable emulation in old and young. No information of a general nature will suit every district, hence any mere list of plant names is unnecessary and perhaps unintelligible; still, certain suggestions may be useful.

In order to avoid disappointment, all planting should be done with a view to future effect, whether as to the position of trees for shade, usefulness or appearance; as to the arrangement of shrubs to prevent future overcrowding (for a shrub properly seen is best seen), and to prevent the unnecessary disturbance of the roots of shrubs, liliaceous plants, etc. Formalities should be avoided as far as possible, aiming rather at improving the natural conditions of the spot. Climbing plants suitable to Queensland are so numerous, grow so quickly, and are so pleasing in their effects, that it would be well to plant them as screens on necessary, though unsightly buildings, to cover fences, dead logs, etc. Many varieties of the rose succeed best for such purposes. It should be borne in mind that the soil of a selector's garden, scrub or forest, requires preparation in the way of deep digging and exposing to the atmosphere, but work well done in this respect is satisfactory in the long run. A covering of mulch, of manure, dried grass, or any such litter around plants is beneficial in the prevention of a too rapid evaporation of moisture, and in the protection to the roots from the effects of the strong Queensland sun.

No feature of gardening in Queensland is more satisfactory than the bush-house. Every selector can, with very little trouble or expense so arrange a bush-house continuous with the dwelling, however "humpy"-like in appearance, and produce an effect unsurpassed even by the conservatories of the noblemen of England. The dimensions of a bush-house must be determined by each one according to his circumstances, always aiming at height sufficient to enable the tree-ferns to show off their noble grandeur. The structure itself consists of a frame of woodwork covered, not too thickly with branches. The ti-tree of the scrubs is the best for that purpose. The arrangement of the walks, beds and rockeries is a matter of individual taste and ingenuity. The main posts supporting the roof can be covered with epiphytal ferns and orchids in the most rustic manner; the stones and logs of wood should appear in as natural looking positions as possible; the walks should be arranged in curves and in any way to avoid the formalities of straight lines. The soil used should be rich scrub, mixed with sand or charcoal to make it porous, which is the secret of successful growth of this nature, especially in

winter. The ferns and other plants of a climbing, erect or rambling habit, if carefully planted and attended to for a short time, require comparatively little further attention. The effect of such an adjunct to the dwelling is almost incredible; it is always pleasing and does away with the endless trouble and failures of the stand of pot-plants. The collection can be increased by the ferns and choice plants of the district and by exchanges.

A new-comer with any taste can easily produce effects in his garden in Queensland which are impossible in a cooler clime, growing successfully his old favourites, the daisy, pansy, fuchsia, dahlia, and the ever-valued rose; while bulbous plants, amaryllis, gladiolus, crinums, etc., luxuriate and flower in rich masses in their seasons, and such plants as petunia, verbena, phlox, coleus, and balsam become naturalised and keep up a perpetual blaze of colour. The grower can have shrubs in masses, such as the hibiscus, poinsettia, lagerstroemia, acalypha, croton, dracæna, etc., etc., harmonising and contrasting in grand effect, while the pleasing sight of flowers and foliage, of climbing and trailing plants, is so easily produced. The aloes and cacti produce lasting and grotesque effects in gardens. In lands surrounding the farm, much beauty can be produced by planting trees such as the poinciana and jacaranda, whether when in flower or leaf, contrasting well with the rich evergreen colour of the spreading and shady native fig, and with the stately grandeur of the palms, pines, and bambo, and lending a beauty to the landscape never dreamt of by natives of a colder clime. The charms of the bush-house, with its ever welcome quiet and shade, its rich growth of ferns of all heights and habits, its peculiarities of shape and colour, of foliage and flower, of begonia, caladium, gloxinia, etc., etc., are a constant source of enjoyment, and give rest to both body and mind. Such results in flower gardening can be easily attained by every selector in Queensland with a little taste and enthusiasm in gardening matters, and will go far to make his life of work and struggle towards comfort and independence happy and contented.

Seed sowing is often a matter of great disappointment. In every garden, no matter what its size, a suitable part should be set apart for this purpose. The seed beds should

be near water and of free and well drained soil, not too rich or heavy, as an over luxuriant growth in this stage is to be avoided. On such soils pressed firm the seeds should be sown and covered only with soil equal to the size of the individual seeds, so that many kinds, and these often the most choice, require very little covering indeed. For covering seeds, well rotted horse manure rubbed fine, or ashes, can be used. These substances allow of the necessary frequent waterings without hardening the surface. The seed beds should never be allowed to get too dry, using always a watering-pot with a fine rose. As soon as the seedlings attain a size fit to handle they should be pricked off in beds of the same nature of soil, about an inch apart. They thus grow strong and sturdy and form fibrous roots which give them a start when transplanted into the garden or into pots. For most annuals in Southern Queensland the end of March is early enough to sow, for then they grow strong and sturdy without shade. If shading is necessary from the force of sun and wind, light branches of ti-tree can be laid on the ground. This covering breaks the force without excluding light and air. Seeds of tender plants such as *Gloxinia* and *Primula* should be sown in well-drained pots or pans and covered with a piece of glass and shaded until they germinate. A very porous soil is best for such purposes, and any watering necessary should be done by soaking the pot in water rather than giving it overhead.

Potting deserves every attention from anyone attempting it on however limited a scale. The nature of the soil used should be determined by the individual genus. The *Begonia*, for instance, requires a rich soil yet porous, while the *Croton* requires a stiff and rich loam. The compost used should consist of well decomposed turfy loam, well decomposed cow manure, charcoal, sand or brick dust, thoroughly mixed in greater or less proportions and fineness as the nature of the genus requires. The substances should be kept dry and should never be used in a wet state. The pots should be perfectly clean and dry; they should be well drained, with broken pots, charcoal, &c., arranged so as to leave interstices for the free passage of water and air. The drainage should then be covered with a rough material, spent hops, broken peat, &c., to keep the drainage

clear. In potting plants at the seedling or cutting stage a small pot of about 3-inch diameter is large enough. The soil should be pressed firm up to the depth necessary to receive the plant, and should also be pressed firmly around the plant, leaving space sufficient to hold water enough to soak the soil. When the plant requires repotting the same rules apply as to cleanness, drainage and firmness. In all cases deep-potting should be avoided. Attention to these details is necessary to ensure the fresh soil being of the same uniform firmness as the ball of the plant, and to allow of the water penetrating the soil uniformly. Firmness in potting is of the utmost importance, since a pot of certain dimensions can only hold a given quantity. If the soil is loose it holds a greater quantity of water than when firm, and as there are no roots in the fresh soil at first, the greater quantity of water held in loose potting produces a sourness which is very injurious to the healthy action of the roots. Too large pots should also be avoided, as it is wiser to keep a well rooted plant healthy by frequent liquid manuring than to risk the evils of a too large pot. Water, when given, should be given freely. Dribbling a little at a time wets the top, while the bottom of the pot, where the most roots are, is kept too dry for health. It helps pot-plants on verandas to syringe the foliage on the evenings of hot days, and also keeps the foliage clean and healthy. Staking and tying should be done as neatly as possible. Even such a plant as the Fuchsia looks better when grown with only one neat stake; the balance can be maintained by frequent turning round and pinching out the tips of the straggling side shoots. The general effect in pot-plants can be so easily marred by the incongruities of disproportionate stakes, ties, or size of pots.

Cuttings.—Few dicotyledinous plants fail to root from cuttings at some time of their annual growth, according to the nature of their wood. Most soft-wooded plants root best from young wood, others from half-ripened, and others from firm and well-ripened wood. The cuttings should be made with a heel of older wood or immediately below a bud. Such plants as Bouvardia, again, propagate easier from root cuttings—*i.e.*, the roots cut up into one-inch lengths and buried in sand. Where all these methods fail, layering invariably succeeds. In every garden there should always

be set apart a corner in a shaded place for rooting cuttings. Many plants such as *Salvia*, *Chrysanthemum*, *Phlox*, &c., are more satisfactory when renewed annually.

Planting.—In any planting operations, whether of annuals, shrubs or trees, the great essentials are, healthy active roots to start with, and well prepared soil as to trenching and composition. All beds and isolated patches should be dug or trenched to a sufficient area not to restrict root action in the first establishment of the plant. The arrangement of plants is a matter of convenience and taste. It is better, if possible, not to plant large trees in beds or borders of flowering plants or shrubs, no matter of how mixed a nature. Perhaps mixed planting is the most satisfactory. Specimens of climbing plants on pillars of showy foliage and flowering shrubs can be planted at intervals sufficient to allow of free and unconfined development the spaces between can be filled with bulbous plants, annuals, and perennials. In this way the plot can be made attractive at all seasons of the year, whereas in separate planting, although the effects may be greater at one time, yet at others the natural exhaustion from rains, drought and heat, produces a blank. Plants such as the rose, azalea, camellia, &c., are better grouped in masses; the effects thus produced by blending and harmonising of colours can never be equally successful when planted apart. Besides, plants such as azalea and camellia will not bear such disturbance at their roots as the ordinary mixed borders require. The time of planting or transplanting is regulated by the circulation of the sap. With plants of a tropical nature, the best time to plant, either by removal or from pots, is in spring, when the sap is rising. The small fibrous roots are then ready to work, and if helped in dry weather with water they establish the plant without interruption, whereas if planted just before winter, when root action is slower or *nil*, the fibrous roots rot with cold and wet, and are unable to supply even the moisture lost by evaporation. March and April are the best months for transplanting large shrubs, especially those of a not too tropical nature, as then the strain from evaporation is not too severe and the temperature of the soil is sufficiently warm to establish activity in the roots before winter. In all such cases the evaporating

surface should be reduced to a minimum by pruning or by artificial shading, and the ground should be protected by a mulch of manure or litter. Manuring by mulch, rather than by digging in, is perhaps the better way. If dug in the heavy rains wash the virtue to a greater depth than a healthy root action requires; but if used as a mulch the roots are benefited and protected from the evil effects of "caking" and "cracking" of the soil. When trees or shrubs are to be planted in isolated positions in soil not previously broken up holes should be dug of not less than six feet diameter. The top spit of twelve inches should be thrown out roughly and the lower spit turned over in the bottom. The whole should be left exposed for a few days to the action of the air. In returning the soil, if not naturally open it should be mixed with rough manure or litter to keep it open, so as to allow the roots to penetrate easily. In heavy and badly drained soil these holes act as basins to hold water, which will result in failure. If the trees are to be planted in rows it is better to trench a strip of 6 feet along the line of planting, to act as a better escape for the water. If that be not sufficient for the nature and lay of the ground proper drainage must be done. The radius of the rooting area must be extended according to growth. Some trees are more surface-rooting than others; in such cases greater area and less depth should be allowed. In planting, the soil should be well pressed round the plant and hollowed so as to allow a good watering to be given. The plant in all cases should be tied securely to a stake, to prevent injury to the roots from swaying in the wind.

Budding is a quick means of increasing the stock, of retarding or encouraging the growth of particular kinds. It is often used for these purposes on roses. It is a doubtful question if budded roses are preferable to those grown on their own roots in our climate, except in peculiar cases; but as a quick and sure means of increasing rare or delicate kinds it is very useful. The stock to be operated upon should be selected with a view to affinity of constitution, easiness of propagation, and freeness from suckering. Thus for the ordinary tea roses the China types make the best stocks. The time to bud is determined by the flow of the sap—*i.e.*, when the bark separates easily from the

wood, generally about December or January, although the period varies according to the season. The stock should be stripped of its leaves and twigs near the ground and a cut made lengthwise about one or one and a-half inch, with a cross-cut made at the top to half the circumference of the shoot, and at right angles both ways to the long cut, using the end of the budding knife, or, better still, the thumb nail to raise the bark along both sides of the upright cut. In selecting the bud of the variety to be used, half-ripened wood should be taken. The knife should be inserted about $\frac{1}{4}$ in. below the bud, in an upright direction, to slightly farther than $\frac{1}{4}$ in. above the bud, removing the wood to half the diameter of the shoot. The greater length of bark cut off above the bud enables it to be held between the fingers without injuring the vital part. Then the wood can be extracted from the bud, great care being taken not to tear out the eye. The bud must immediately be moistened in water, or, better still, in the mouth, saliva acting more favourably than water. It should then be inserted downwards from the cross-cut on the stock, under the raised bark. When in position the excess of bark above the bud should be cut away exactly in the cross-cut, so that the bark of the bud shall be exactly continuous with the bark of the stock. The exact fitting is very important, because it is at this point that union takes place. It is the sap descending through the bark, not that ascending through the woody tissue, which forms wood. When the bud is in position it should be tied above or below, not too tightly, with cotton or worsted, which will rot by the time a union has taken place. The knife used should be very sharp, as a clean cut heals more quickly than a rough one.

Grafting can best be done in winter. "Hedge" and "whip" grafting are the generally adopted methods. Hedge grafting should not be used for hard-wooded plants, but it is a safe and quick method for such as roses. The grafts should be of well-ripened wood, and at least from 4 inches to 6 inches in length, cut wedge-shape with a slope of about 2 inches. The stock should be cut off a little below the level of the soil, and split down to 2 inches to receive the wedge graft. The soil should be removed a little lower to allow the work to be done cleanly. Whip-grafting differs

from wedge-grafting only in having one side of the graft and stock cut obliquely. If, in both methods, the grafts and stocks are of equal thickness so much the better. If not, the barks of each should fit on one side, as it is at this point of junction of the barks that union takes place. In both methods also a bud should be left on the grafts near the bottom and not tied over, for probably the strongest shoot will start from the lowest bud. After tying firmly in position, the grafts should be rubbed over with well-worked clay, and have the soil brought back, covering the whole graft so as to exclude air. A light mulch of litter will very much benefit the buds when they start, and as soon as possible the energy of the stock should be gradually concentrated into the new growth by rubbing off superfluous shoots.

Pruning is one of the most important works of a garden, and a thorough understanding of its objects, as well as the laws governing it, is very desirable. The main object of pruning is to maintain a healthy balance between the roots and branches, whereby the greatest return of flower and fruit can be got. There are three principal methods to this end: First, by disbudding—*i.e.*, by rubbing off in the early growth all superfluous shoots, not desirable either from the danger of overcrowding or, as likely to be, too great a strain on the plant; also by pinching out the growing points of too strong shoots, so as to distribute the energy laterally. This method is preferable, as the greatest possible economy is practised in allowing only necessary growth. Second, by removing or reducing matured wood. This should always be done when the sap is rising, for if shoots are removed from deciduous trees at any other time when the leaves are off the sap escapes by bleeding, there being no leaves to elaborate it. All wounds should be cleanly cut, and should be of the least possible size to facilitate healing. This pruning should be done so as to remove, first, all dead and sickly growth, and then the shoots reduced or cut away so as to balance the plant, and to admit the greatest amount of light and air through the plant. All branches which injure by crossing should be removed, but large limbs should be cut off sparingly so as not to disarrange the flow of sap, and should be smoothed over so as to heal

quickly. Third, by root-pruning, which is often done when the growths are too strong for free flowering. The ground should be opened up at varying radii, and the strong shoots sent back so as to induce a more fibrous growth. The same result can often be obtained by tying or bending down the over-luxuriant shoots. The upward flow of the sap is wasted, and the dormant buds along the shoot are forced into growth.

The time for pruning roses varies according to the season, and the kind of roses, whether climbing, hybrid perpetual, or tea. Climbing roses should never be pruned too severely, merely having the old and exhausted shoots cut away and the stronger ones bent down so as to force them into flower. Hybrid perpetual roses require their exhausted shoots cut out and the growth shortened according to their strength. A too severe shortening increases the great objection to this grand class in our climate—too much wood. Tea roses can be pruned successionally so as to prolong the main flowering season. A commencement can be made in March, when the bushes can stand a pruning into shape and young growths shortened to one bud. The centre of the bush should be open so as to allow of free circulation of light and air. Cuttings taken from April or July root freely if the cutting is of firm wood, about 6 inches long, and buried firmly in the beds to about one eye.

The necessary briefness of a paper such as this prevents any more than a passing notice of many important matters of detail, or to special treatment in the cultivation of special classes of plants.

At all seasons of the year the aim should be in the garden to have cleanliness and neatness as far as possible. These qualities show as favourably as excellence of cultivation.

List of annuals suitable for winter and spring gardening:—Aster, pansy, petunia, candytuft, larkspur, gaillardia, calliopsis, schizanthus, Bartonia, Rhodanthi, seabrosa, salpiglossis, stock, marigold, phlox, dianthus, antirrhinum, mentzelia, Marguerite, lobelia, pyrethrum, &c.

Annuals for summer and autumn gardening:—balsam, zinnia, celosia (coxcomb), amarantus, and sunflower.

Bulbs such as gladiolus, ixia, sparayis, anemone, ranunculus, crocus, tulip, and hyacinth, can be planted in April, in masses, and in rich soil.

Lists of roses suitable and worthy of cultivation:—climbing Marechal Niel (yellow), Reine Marie Henriette (red), climbing Devoniensis (creamy white), Gloire de Dijon (salmon), Madame Berard (salmon), la marque (white), chesnut hybrid (carmine), sofaterre (sulphur yellow), Rêve d'Or (yellow), W. Allen Richardson (an exceptional yellowish colour), cloth of gold (yellow), climbing Jules Margothir (cherry), Celine Forrestier (pale yellow), Bank-sias (white and yellow).

The subject of suitable labels for plant names has always been a vexed question; the label should be cheap and durable. Such labels can be make of zinc, of size and shape to suit the requirements of the name. The zinc used should be of the V.M. (Ville Montague) brand, and, before written on, should be cleaned with a weak solution of spirits of salts to remove all surface impurities. The ink used should consist of 16 grains of bichloride of platinum to the ounce of water, and three or four drops of nitro-hydrochloric acid added, and should be kept in a glass-stoppered bottle. A quill pen only should be used. The writing is indelible, if protected from moisture by a covering of the best copal varnish.

ALEXANDER M. COWAN

RICE.

RICE (*Oryza sativa*) is a kind of grass originally a native of the East Indies, but now cultivated in all quarters of the globe wherever the conditions of warmth and moisture are suitable. It is a semi-tropical plant, and requires much moisture at certain times in its growth. Rice contains, according to the views of chemists in these days, a smaller amount of flesh-forming substances than any other grain, but a larger amount of heat-giving substances. As a food, consequently, it is peculiarly suitable for hot climates.

The consumption of rice is probably greater than that of any other grain; it is, in fact, the chief article of diet of nearly half the population of the globe. The population of the world was estimated in 1876 at 1,424,000,000, and as the population of the rice-consuming countries is, for India, say, 300,000,000, and China 400,000,000, to say nothing of other places, we see that nearly one-half of the population of the globe use rice as their chief food.

The amount of rice imported into this Colony in the year 1886 was 3,462 tons, valued at about £50,000. It has long been known in the Colony that rice could be grown here, but the idea that it was a crop that required a large amount of cheap labour has kept it from being cultivated to any extent until the last two years, when a good many acres were put under rice about Port Douglas, and a small rice mill was erected in the town; since then other rice mills have been put up, and it is now known that rice does not require any more labour per acre than corn. The growers imported five or six varieties of seed rice, but as the names of these are not known it is impossible to say which is the best. The rice planted in the north of Queensland is a hill rice, and does not require to be planted in a swamp with an inch or two of water over it as is the case with some other kinds of rice. Some of the best returns have been obtained on land which was perfectly drained. Any good soil fairly well drained will do:

it is more a matter of getting rain at proper times than having a naturally wet soil as is generally supposed. Rice requires a great deal of rain, not constant but frequent, and to thrive well the crop ought not to go three weeks without rain. It is therefore, in North Queensland, planted at the beginning of the wet season, at the end of December and beginning of January, the wet season generally lasting for about four or five months.

The mode of planting rice generally adopted is to plant thickly in beds, and when the plants are about six inches high they are transplanted into holes made with the hoe, putting two or three plants in each hole, the holes being a foot apart and the rows two and a-half to three feet apart. It will not be long before the rice is sufficiently high to keep down the weeds. This mode of planting is, however, tedious and gives unnecessary trouble. What should we think of anyone in these days who planted wheat in beds and then transplanted? Equally good results have been obtained by planting the seed directly with the hoe at short distances apart in the row, placing one to two seeds in the hole. If the land were under the plough, the rice could, no doubt, be sown and reaped in the same manner as other grain. Care, however, must be taken to reap the crop at the right time, as if it is at all too ripe a great quantity of grain will be shaken out and lost.

In about six months from the time of planting, the rice will be fit to cut and gather. It is generally cut about six inches from the ground with reaping hooks, and laid on the ground; other men then come along behind and tie it up into sheaves or bundles and stack it until ready for threshing. It is afterwards threshed with sticks until the grain comes out of the straw, and is then winnowed to remove light and inferior grain. The rice in this state is called "paddy rice," and is sent to the mill, where it is hulled, winnowed again, and finally polished. It is then fit for the market.

The average yield of rice per acre is about one ton of polished rice, but in good seasons as much as two tons of "paddy rice" per acre have been harvested. One ton of dressed or polished rice is equal to one ton and a-half of "paddy rice."

Like all other crops, rice has its enemies and diseases. A kind of rust appeared in some places last year, and there are some grubs which feed on the roots; and a good deal of harm was occasioned last year from both these causes. The rust has also appeared again this year, and it is feared the crops around Port Douglas will be a failure. There must be many other varieties of seed rice which have not yet been tried, and the sort most suitable to this country has probably not yet been found.

As much as 700 acres of rice were planted last year about Port Douglas, and though in some places the returns were very good, on the whole, owing to the abovementioned causes, the crops were a failure. Only about 300 acres have been put under rice in the same district this year, and only a few acres in the Cairns District. In the Cairns District the Carolina upland rice has been planted, but it is too soon yet to form a decided opinion as to its value.

The largest mill yet put up in the Colony has been erected in Cairns by Mr. Behan, and is capable of turning out one ton of dressed rice a day. The cost of a rice mill capable of turning out about one ton a day is about £600 including erection.

The price paid by the mill-owner in Cairns for "paddy rice" is £8 10s. per ton, but in Port Douglas as much as £9 to £10 has been paid. The rice when dressed, after having been put through the mill, is worth about £17.

It is probable that rice will become one of the best paying semi-tropical crops as soon as experience has taught what seed to plant, and how to avoid the rust to which it is subject; but intending growers are advised to put only small areas under crop until the cultivation of this grain has advanced beyond its present experimental stage.

C. A. COLLARD.

TOBACCO CULTIVATION IN QUEENSLAND.

CHOICE OF LAND.—For the purpose of growing tobacco a good piece of country fronting on a river or any permanent water is desirable; failing this, a spot where water may be obtained easily by sinking.

TOOLS, ETC., REQUIRED.—A farmer intending to grow tobacco, and having to commence on bush land, should be on his ground early in April, and would require two horses. a dray or cart, one light two-horse plough, and the ordinary kit of bush tools—viz., an axe, adze, handsaw, crosscut saw, maulrings and wedges, spade, pick or mattock, and shovel.

This is assuming the intending grower to be an able-bodied man, and of ordinary intelligence, capable of doing most kinds of work such as ploughing, fencing, clearing, and rough carpentering.

HUT TO BE ERECTED.—He must now commence operations at once, and erect himself (supposing he is a bachelor) a hut, one 10 feet by 12 feet; walls 6 feet 6 inches high would be sufficient, and could be made of round stuff and bark. If a married man, one 20 feet by 12 feet, walls 6 feet 6 inches, divided into two rooms, with verandah in front 4 feet wide, and fireplace in one end. These huts to be put up by contract would cost £5 and £12.

CLEARING THE GROUND.—The hut being finished, he should now start clearing the ground required for his cultivation, say five acres; whatever is cleared must be grubbed out to a depth of at least one foot from the surface, and the roots all run to that depth; the logs, branches, &c., all burnt on the ground, or hauled off, the former way the best.

PLOUGHING.—When cleared, the ground should be ploughed to a depth of about four inches, left lie for at least a month, then harrowed well so as to draw out and kill the grass; then plough a second time before planting out the tobacco, this time to a depth of from six inches to

eight inches, the deeper the better ; then harrow twice, or oftener if necessary, to make ground fine. Cost of each ploughing usually 25s. per acre.

FENCING.—Fence in the cultivation with a fence of split posts, put every 8 feet with four No. 8 wires run through. Five acres will require 30 chains of fencing to enclose it; number of posts required for 30 chains, 245; usual contract price, 20s. per 100. The posts should be put 20 inches, in the ground, and bored for the wire to run through, and a round post for straining the wire to every 100 yards. This post should be 3 feet in the ground and stayed. Four No. 8 wires are quite sufficient to keep out stock. Weight of wire required for 30 chains, 5 cwt. 2 qrs. To keep out sheep, six wires would be required. The cost of this fence by contract should not exceed 12s. 6d. per chain. Cheaper kinds of fence could be used such as dog-leg, cockatoo, &c., but the above is a good, sufficient, lasting, and quickly erected fence.

SEED BEDS.—Tobacco seed should be sown in July for an early crop, but one crop may be obtained from seed sown as late as December. The beds may be made anywhere, and may be made before the clearing is finished or the ground ploughed. Where a log has been burnt in the bush is a good place, as the young plants will come up free from weeds, and the burning does the ground good; ashes mixed with the ground is also good.

As the seed is very fine it is better to mix it with ashes or fine earth before sowing, so as not to sow too thickly; about half an ounce of seed should be sown for each acre intended to be planted out. The seed-beds should be about 2 feet 6 inches wide—not wider—so as to be able to weed from the side without treading on the bed, and may be any length. The mould at the outer edges of the beds should be slightly ridged to prevent the water from running off when watering. The ground should be well and carefully worked, and worked very fine before sowing. The beds must be covered so as to protect them from the frost. The usual covering used here is long grass laid over the bed, through which the watering is done. This plan is, I think, liable to make the plants delicate, and inclined to generate blue mould. The best covering is calico or

bagging, raised about a foot from the bed, stretched on poles laid in forks erected in the ground. This covering can be easily removed during the day, and replaced at night, thus giving the ground and the plants the benefit of the sun during the day. When the frosts have left, there is no occasion to cover the beds at night. The beds should be watered every other day, during dry weather, with a watering-pot with a fine rose. If the rose is coarse it is apt to wash the seed out of the ground. When the leaves of the plant are about 3 inches long it is then fit to plant out in the field.

BLUE MOULD.—Should blue mould attack the young plants in the beds, as it sometimes does in wet seasons, killing the whole off, fresh seed should be sown in a fresh place.

Blue mould first appears on the underneath side of the bottom leaves in spots, and is very easily recognised when seen. The top side of the spot on the leaf appears yellow, but underneath there is a bluish mould adhering to the leaf. There is no cure, that I know of, except dry weather. Blue mould may attack the plants at any time in wet and cold seasons, but after the plants are grown it is not so likely to destroy them as in the seed beds. If the crop is badly attacked it is best to cut the plants even if unripe, and trust to the next growth being healthy.

PLANTING OUT.—The young plants should be put out 4 feet apart each way. I think this distance apart is the best, as it allows the plant plenty of room, and the leaf obtained is finer. The plant should be put out in a slight depression made with a hoe, about two inches lower than surface. The ground should be fine and pressed tightly around the roots of the plant when planting. Seed sown in July ought to be ready to plant out in October; for seed sown later, at any time when fit. Cloudy and showery weather is the best for planting out, as then there is little or no necessity to cover or water the plants. In planting out in dry weather the plants must be watered and sheltered from the sun until they strike, usually four or five days. For shelter a handful of long grass laid over the hollow in which the plant is planted is sufficient, and need not be removed to water.

ENEMIES TO TOBACCO.—The plants must be carefully watched while growing, and kept free from grubs and caterpillars. There is a brown grub that eats the leaves of the young plants in the night and early morning, hiding under the ground during the daytime; they are easily dug out with the finger, and their hiding-place seen by the ruffled surface of the ground. These grubs cease to be any trouble after the plants are grown clear of the ground. The next enemy is a thin green caterpillar; this eats the leaves also, and is found on the underneath side of the leaf. There is also a grub that eats into the stem of the plant, and if left would destroy the plant attacked. This grub is killed either by cutting out or running a piece of wire or stick into the hole in which it is, and crushing it. The grasshopper occasionally eats holes through the leaves.

PLANTS WHILE GROWING.—Plants while growing require close attention, and must be kept free from weeds; after they have grown a little the earth should be hilled up round the roots. The cleaner and freer from weeds the ground is kept the better. The small underleaves should be taken off so as to allow the leaves to grow clear of the ground. When the plant begins to show the bud for blossom, this bud should be nipped off leaving about fourteen leaves on the plant. The bottom leaves should be taken off when they droop to the ground, and broken leaves are also better for being removed. These leaves are marketable as fillers, and should be strung together on twine and dried in the shed, or else spread out under cover to dry. Suckers start to grow where the leaves join the stalk; these must all be picked off. When the tobacco is ripe, which it should be in 10 or 11 weeks from the time the plant has struck, it is cut and taken to the shed.

LEAF WHEN RIPE.—The leaf when ripe is thick and gummy, has a mottled appearance, and the tip of the leaf is turned downwards and dead. Cutting must not take place during rain, and should rain come when the plants are ripe they must not be cut till two or three days of fine weather have intervened, and not then unless the sticky feeling has returned to the leaf.

SECOND CROP.—After cutting, the roots will start to grow again for the second crop. Only one sucker must be allowed to grow, and this must be treated and trimmed exactly as described for first crop. This crop will arrive at maturity, that is, the leaf will be ripe in about eight weeks in a fair season, and is generally the best crop.

THIRD CROP.—After the second crop is cut it is possible to obtain a third if the season is good and the tobacco has been planted out early. This is treated in the same manner as the second crop, but should be cut before frosts set in, for frost will turn the leaf black and render it unfit for market.

PLANTS REQUIRED FOR SEED.—Plants required for seed must be allowed to grow from the first planting out; the second crop will not do. One plant will yield about $\frac{1}{4}$ lb. seed. The leaves must be stripped off the plant as they ripen and taken to the shed. The stalk with the head of seed should be tied to a stake driven in the ground for support. The seed pods must be taken off as they ripen.

After the last crop has been taken off, the ground should be ploughed and allowed to lie fallow till time to plough for next season's crop.

DRYING SHED.—A drying shed of sufficient size to dry the crop off 5 acres would require to be at least 60 feet by 36 feet, made as follows:—Main part of shed, 60 feet by 20 feet; height to top of wall-plate, 12 feet 6 inches. On each side of main shed a skillion 8 feet wide; height of skillion plate 8 feet 6 inches. Post of main shed to be every 10 feet; also a row of posts 10 feet apart running down centre of main shed; the skillion posts must also be 10 feet apart. The posts of the main shed morticed as slip-rail posts, running lengthways of the shed, one mortise to be 4 feet from top of wall-plate, and another mortise to be 8 feet from top of wall-plate. The skillion posts to be mortised 4 feet from top of skillion-plate. Rails can then be put in these mortise holes. These rails are to support light poles on which the tobacco is hung, thus giving three lengths for drying tobacco in the main shed, viz., on the wall plates, and a plate that must be run along the centre line of posts, on the rails is mortises 4 feet from the plates,

and another on the rails 8 feet from the plates. In the skillion two lengths of tobacco can be hung, viz., on the skillion plate, and on the rail in mortises, 4 feet from plates of main shed, and on the rail in mortises 4 feet from skillion-plate, and rail 8 feet from plate of main shed. Another length for drying can be obtained in the roof of the main shed by ties placed across the rafters every 6 feet. This shed may be roofed with iron, shingles, or bark, according to the means of the farmer. The sides and ends need not be enclosed, but it is best to hang calico or hessian round the sides and ends this can be left down in wet weather and raised during fine.

This is the best and most workable kind of shed, and is easily erected being made all of round stuff, and if roofed with bark would cost about £50. As the rails are in slip-rail mortises they can be taken out at any time, and the shed could be used for any other purpose.

DRYING TOBACCO.—The tobacco after it is cut is brought to the shed and there hung up to dry; it may be hung up in several ways—viz., by tying two stalks together and hanging one on each side of a light pole 11 feet long: each end of this pole is placed on one of the rows of rails mortised into the posts of the shed. The tobacco is hung side by side till the length of the light pole between the rails is filled up; then another light pole is put on the rails and filled up in a similar manner, and so on. Thus the tobacco is hung across the shed, and each row of rails filled up. Another way to hang tobacco is to split the stalk to within about 9 inches of the root end and putting half on each side of the light pole and arranging it as described previously, or a peg may be driven into the stalk and hung up on the light pole by that. I prefer splitting the stalks as they are less likely to be blown down after they have been put up, and the splitting causes them to dry rather more quickly. It is best not to put the poles with the tobacco on too close at first—that is, they should not be pressed tightly together, for if open the tobacco will dry quicker and is not so apt to heat or go mouldy in wet weather; if room is required in the shed the tobacco can be packed much more closely after it has partially dried.

TO DRY TOBACCO LIGHT.—If the leaf is required to be dried light of a bright colour, poles should be arranged about 3 feet from the ground and 10 feet apart on forks or posts put in the ground in the open air outside the shed. The light poles with the tobacco on should be taken from the shed and placed on these poles for a few hours each day in the sunshine, and taken back into the shed at night, or should rain come up, for it must not be allowed to get wet either by dew or rain. This should be continued for a week or ten days, after that it can remain in the shed till dry.

For dark tobacco, after once hanging it is left till dry enough to hand up. If placed reasonably apart so that the plants press lightly against each other, and the calico sides are left up during the day, it will dry in from six to eight weeks in summer time; in cooler and wintry weather it takes longer. Should much wet weather occur while the drying is going on the leaf is liable to go mouldy; to prevent this a few slow fires should be lighted in different parts of the shed in holes dug just below the level of the floor. The fires should not be allowed to burn high, and the tobacco should be moved from their immediate vicinity to avoid the possibility of its taking fire. If tobacco is dried in a close shed and hung closely it will dry dark; if dried in an open shed it will dry lighter coloured.

HANDING-UP.—When the leaf is sufficiently dry, which is known by the green sap having left the stem of the leaf, it should be handed-up—that is, the tobacco should be taken down and stripped off the stalk by hand, and made up into small bundles of about 1 dozen leaves; these leaves are placed with their stems even and bound together at the stem end by another leaf being twisted round and the end doubled in amongst the leaves. These bundles are called “hands.” While handing-up, the tobacco should be classed according to quality and colour. Handing-up cannot take place in dry weather as the leaves are generally too brittle; it must be done either of a dewy morning or during rainy weather.

STACKING.—After handing-up, the tobacco must be stacked, on bark or boards laid on the ground, or, better, raised a few inches from the ground. Place the hands when stacking with their stems outwards, only two in

width, with the tips of the leaves slightly overlapping in the centre. The stack may be made any length, and will stand to about six feet high. It should be closely covered with calico, bagging, or canvas, and poles or slabs laid on the top to weight it; the covering kept as close as possible to keep out the air. The stack should be tried occasionally to see that it does not heat; this is done by pushing the hand into it. If the heat is considerable the stack should be taken down and re-stacked: the fact of moving it and letting the air in is quite sufficient to arrest heating. If it again heats the same course must be adopted. It is best to make several stacks, leaving room to pass easily between. Stacks, unless the leaf is very short, should not be made wider than the two hands. There is little danger of the tobacco heating unless it is too green or wet when stacked. The drying and handing-up applies to all crops alike.

BALING-UP.—After the tobacco has been stacked for a month or six weeks it should be fit to bale up, but should not be baled up if damp, as then it would be likely to heat and go mouldy in the bale; neither should it be too dry, as then the pressing would cause considerable breakage the leaves being brittle. The leaf should be tough and pliable so that it can be handled without breaking. Damp weather should be chosen for pressing and baling.

PRESSING.—For pressing, an ordinary box lever press is suitable as no great pressure is required. A box made strongly, with frame outside so that one side can be removed; size of press 3 feet long, 2 feet wide, and 3 feet high; no bottom is required. The bales can be made of calico or hessian, which is quite strong enough to hold the tobacco together, and should be placed inside the press the tobacco being packed inside them for pressing. Bales contain from 2 cwt. to 3 cwt. of tobacco. The tobacco should be baled up according to its quality, and the bales marked accordingly.

VARIETIES OF TOBACCO.—The most useful and marketable kinds of tobacco are Virginian and Kentucky. They are good heavy bearers and pay the grower well.

Havana is good tobacco for cigars, but yields a very light crop. This kind may be planted 3 feet apart each way in the field, as it does not grow to any great size.

Broad Dutch is a very heavy yielder, but is disliked by the manufacturer being too coarse and ribby.

TABACCO A HARDY PLANT.—Tobacco is a hardy plant and will stand dry weather after it has once struck in the field.

AVERAGE YIELD.—The average yield of tobacco per acre is about 15 cwt., but in good seasons, when the tobacco is planted out early in October, three cuttings may be obtained from the one plant and a yield of 25 cwt. to the acre obtained.

The price of good sound leaf suitable for wrappers is not likely to be under 6d. per lb., so that the average yield per acre would not be under £40 gross.

THE PRICE OF TOBACCO.—The price for good sound leaf during the last seven years has ranged from 8d. up to 11d. per lb.

TIME OCCUPIED.—A farmer growing tobacco would require to attend closely to it during eight months of the twelve; the remaining four would be holiday as far as tobacco is concerned.

DISTRICT SUITABLE FOR TOBACCO.—The country suitable in every way for the cultivation of tobacco extends from Mingoola down the Severn River to Goondiwindi, a distance of 110 miles; the district round Inglewood and on the McIntyre Brook to Canning Creek, a distance back from the Severn River of 40 miles. Corn, lucerne, wheat, oats, rye, barley, potatoes, pumpkins, vegetables of all descriptions, fruit, oranges, and vines, have all been tried within this area and found to flourish, so that a farmer starting in this district need not rely upon the tobacco industry alone.

EDGAR B. GREENUP,
Copmanhurst,
Texas.

NOTES ON THE BANANA.

THE cultivation of the banana is of considerable importance, both as a food producing and fibre yielding plant. It has been long established, and extensively and successfully cultivated in suitable localities in various parts of Queensland, but on the coast lands extending from Point Danger to Thursday Island (upwards of 1,500 miles) there are still many thousands of acres of unselected rich forest and alluvial scrub lands, which are well adapted for the culture of this valuable plant.

The site being selected, the operation of felling the trees and undergrowth begins and is proceeded with until the work is completed. After the trees, &c., have lain a sufficient time to become dry and fit for burning, the small brushwood is piled up in heaps, the branches of the fallen trees are cut off and piled upon the dry logs, and on a dry day with a brisk wind are fired and kept burning until all is consumed. The land is then thoroughly drained so as to admit no stagnant water to lodge therein. This being done, the whole of the ground is trenched over to a depth of from two to three feet, which with care should be sufficient to last for eight or nine years before being renewed.

The season most favourable for planting is in the months of March, April, September, and October. The plants should be placed not less than sixteen feet apart, the same distance being between the rows. The intervening space could be utilised for one or two seasons in the culture of maize, &c. When planting the banana care should be taken to place the roots twelve inches under the surface and to have the soil made firm around the stem. From the time of planting to the period of bearing, the varieties vary from twelve to eighteen months. During stormy weather the fruit-bearing stems are apt to break down, therefore those with heavy bunches should be propped. After the fruit has been gathered the stems should be cut off near the surface, and only three or four strong suckers surrounding the root stock from two to

three feet apart left for next season's crop. All other suckers should be cut off along with the old stem and thrown into the manure pit.

The following varieties—viz, cavendish, dacca, sweet, sugar, and purple, were all introduced previous to 1854 by enterprising gentlemen fond of agricultural and horticultural pursuits, and all are familiar to most cultivators and fruit merchants for their high commercial value. They are all propagated by offshoots or suckers arising from the root stock. The cavendish is the most productive, yielding bunches upwards of 120 lbs. in weight and containing from 20 to 25 dozen fruits from 6 to 8 inches in length, which when brought to market have realised from 2d. to 4d. per dozen. The dacca, sweet, and sugar yield bunches with from 10 to 14 dozen fruits of excellent flavour, and generally sell at from 2d. to 3d. The bunches of the purple variety contain from 10 to 12 dozen fruits, of a reddish-yellow colour, delicious flavour, and very nutritious. This variety is much sought after. Many other varieties have been introduced from Java, Singapore, and other countries, but none have yielded fruit equal to the abovenamed.

The system adopted by those whose plantations are at a distance from the shipping port is to cut the bunches that are ripe, with others that are only half ripe, and have them conveyed in boats, wagons, &c., to the purchaser's mart. The ripe fruit is there disposed of to local consumers and the others packed in perforated barrels, open boxes, &c., for exportation to the Sydney, Melbourne, Adelaide, and Tasmanian markets. There are two methods used in preserving the banana: the first, when the fruit is nearly ripe, produces the farina; the second, when the fruit is completely ripe, produces an article of the same class as figs, &c. The preparation of this farina is very simple: the fruit is first peeled, then cut in slices and quickly dried in the sun; when sufficiently baked the slices should present a hard, brittle, and horny appearance. These slices are then coarsely ground and sifted, and in this condition is a valuable addition to our articles of diet.

It is calculated that an acre of bananas gives upon an average 2,350 lbs. of meal, which if it were to realise only the price of arrowroot of medium quality would give a

large and remunerative return for the culture. There can be no doubt of the value of the meal as an article of food, and of the benefit of preparing it wherever the fruit is produced in larger quantities than can be consumed.

The other mode of preserving bananas closely resembles that employed in the preparation of other dried fruits. When the fruit has become thoroughly ripe it is placed on wire sieves and exposed to the sun till the skin begins to shrink. The skin is then taken off and the fruit again exposed until a white mealy substance appears on the surface. The fruit is then pressed and packed in small boxes.

Experiments on both these methods were successfully made in Brisbane in 1869, and samples were exhibited at the Intercolonial Exhibitions held in Sydney in 1869, 1870, 1871, 1872, and 1873, and were highly commended by skilful practical men.

With the increase of population and steam communication to and from the newly formed townships on the Queensland coast, the cultivation of the banana has extended enormously and proved remunerative both to the grower and merchant. The demand for this fruit is still good, and the extension of the railway from towns on the coast to those in the interior will still further increase the demand and offer inducements to the cultivator to extend the culture of the banana plant to supply the increasing population of the interior.

WALTER HILL.

FORESTRY.

THE conservation and extension of our forests is properly a function of the State, but before it can be efficiently performed it is indispensable that an enlightened public opinion should prevail on the subject. Although there may be but few in position to render direct and practical service to the cause here advocated, everybody is able to help in diffusing correct views, so as to create in time such a drift of public opinion as may overrule the clamour of the vested interests that have grown up at the expense of this branch of the people's inheritance, and which interests would, if permitted, soon leave the Colony destitute of the last trace of forest vegetation. While forest conservancy and culture on an effective scale are only attainable under State supervision, there is no settler, however limited his holding, who cannot render yeoman's service in striving to avert the consequences of the wanton and indiscriminate destruction everywhere in progress. If nothing more, he can at least impress on all his dependants, both by precept and example, the high economic value of forests to any community; the exceeding slow growth of the more valuable timbers—so quickly destroyed and so difficult to replace; the alarming rate at which those once abundant are disappearing under the hearer's very eye. He can point to tracts, once umbrageous with pine, cedar, silky oak, yellowwood, and other high-priced trees, whose very aspect the children of the present generation have no knowledge of save from hearsay, so completely have they disappeared from the face of creation. He can enlarge on the beneficial influence of forests in averting bleak or parching winds, protecting the crops in their vicinity from frost, attracting and regulating rainfall, promoting the absorption of moisture by the soil, and checking excess of drainage and evaporation, and thus maintaining at an average level the supply of water from springs, lagoons, and creeks; and having thus conclusively shown that the mysterious operation attributed to forests in modifying and improving the

climate of a country is founded on facts within the personal observation of all, he may fitly denounce the felling of even one immature and well-grown tree, unless an equivalent be rendered in cultivation or some other genuine improvement.

Thus, although forestry in its wider sense may be outside the sphere of most farmers, all have it in their power to preserve, and induce others to preserve, a portion of the fair and fast-waning dowry that nature has bestowed on the land. This dowry is a sacred trust, not to be wantonly squandered in mere caprice, but jealously guarded in the interests of coming generations, and sparingly and reluctantly encroached on only when the paramount claims of agriculture justify such a course. The fortunate owner of scrub land, on which cedar, pine, or other valuable timbers are growing, should think twice before making a complete clearance of them, however great the demand, and however tempting the offers he may receive. If in the course of clearing for cultivation their removal become absolutely necessary, a few well-grown, and if possible still immature, specimens should be left in positions where they will not interfere with the plough or the hoe—if for no other purpose, at least as a source of seed supply. The properly ripened seed of most of our more valuable timbers is becoming more and more difficult, in places almost impossible to obtain, and wherever this is the case natural reproduction of such trees by means of spontaneous seedlings is quite out of the question, and the obstacles in the way of forming nurseries are proportionately increased.

In clearing scrub land it is an excellent plan to leave untouched a belt of standing timber, from half-a-chain to a chain in width, all round the land to be put under crop. Such a belt—which is in fact a forest reserve in miniature—serves as a protection against keen or parching winds and excess of rain or sun, as well as being capable of being used, by the improving settler, as an experimental nursery for young indigenous trees, many of which will only thrive in the semi-darkness of the natural jungle. It is to be remarked that a strip of limited width is more easily watched, cleaned, replanted, and otherwise improved than a compact block, the seeming vastness of which repels instead of inviting the hand of labour. The cedar (*Cedrela*

toona), which grows readily from cuttings as well as from seed, is probably the most advantageous native tree to cultivate in these belts, as it is far less tender than the pines though equally slow of growth. The silky oak (*Grevillia robusta*), which is almost equally valuable for certain purposes, is of much faster growth and needs little or no protection. It may be therefore profitably planted on the outskirts and exposed corners of the reserved patch, where it will admirably fulfil the purpose of breaking and "sifting" rain, wind, and sunshine. As a general rule the planting-out of the native pines (*Araucaria Cunninghamii*, *Agathis Australis*, *Dammara Moorei*) is not to be recommended, as they are extremely sensitive to unfavourable conditions of situation and exposure. An exception may, however, be made in favour of the bunya pine (*Arauc. Bidwillii*), which is of a hardier nature, and in rich soil makes tolerably rapid growth, while the timber is but little inferior to the other native species. Settlers without scrub on their holdings should lose no time in seeking to create, artificially, similar belts around the more exposed portions of their lands, preferring for this purpose fast-growing species of foreign origin to the more delicate jungle timbers, which will be mostly found unsuitable to exposed situations. Where the object is to provide a rapidly springing shelter combined with shade, there is probably nothing better as a stand-by than the common camphor-laurel (*Camphora officinalis*). It is easily raised from seed, bears transplantation fairly well, grows at a great rate when young, and in the course of a very few years forms great globular masses of shining fragrant foliage forty to fifty feet in height, completely excluding both sun and wind, and producing every year abundant crops of seed for propagation. Like our native eucalypti it is a purifier of the air, and a destroyer of miasma rising from over-rich or ill-drained soil. Other trees highly suitable for forming belts of timber in the coast region are the silky oak, the carob (*Ceratonia siliqua*), mulberry—especially the large Indian variety; the shady acacia (*Albizzia*, sp.), jarrah (*Eucalyptus rostrata*), lemon-scented gum (*Euc. citriodora*); and for conifers, the bunya pine (*Arauc. Bidwillii*), canary pine (*Pinus Canariensis*), noble pine (*Pin. insignis*), Aleppo pine (*Pin. Halepensis*), and Norfolk Island pine (*Altingia excelsa*). For heights

of a thousand feet and upwards above sea-level, the planes (*Platanus orientalis* and *occidentalis*), walnut (*Juglans regia*), hickory (*Carya alba*), linden (*Tilia europæa*), chestnut (*Castanea vesca*), maple (*Acer pseudo platanus*), horse-chestnut (*Esculus hippocastanum*), redwoods (*Saquoia rubra* and *Wellingtonia*), deodar (*Cedrus deodara*), totara (*Podocarpus totara*), and Himalayan cypress (*Cupressus macrocarpa*). In raising seedlings, the plan adopted by the South Australian Forest Department will save an infinity of trouble and disappointment when the time for planting out comes : it is as follows :—The first requisite is to procure a quantity of the common Spanish reed (*Arundo donax*), of which white and variegated varieties are found in almost every garden. There is a stout reed growing on some of our tidal rivers that will answer the purpose almost equally well—in fact, any grass-like plant with tubular stems of from $\frac{1}{2}$ inch to 1 inch diameter will do ; the main object being to provide a more or less perishable tube, into which the young seedling may send down its roots, and that can be removed along with it for planting out without any disturbance of the tender root-fibres. Having procured the reed or other suitable material, the next move is to cut the hollow stems into pieces of exactly equal length, say six or eight inches, according to the depth of the boxes intended to be used for sowing in. The lengths, when cut, are packed upright in the box until it is entirely filled, when the upper surface of the planting-bed should be perfectly level, and have a honey-combed appearance from the multitude of small tubes standing side by side. The simplest and easiest way to pack the box is to lay it on its side, and build up the lengths of reed horizontally layer by layer, until they are tightly crowded, after which the whole is brought into the proper position for sowing. A mixture of two parts fine leaf mould and one part sharp sand is now sifted evenly into the box, taking care that each little tube is filled from top to bottom with the compound, and tapping and shaking the box to settle the contents until the top edge of each length of reed is only just visible above the surface of the mould. One, or if very small, two seeds are now dropped on to the mould in each cell ; or if this be found too tedious, sifting the seed through a cullender or similar con-

trivance will generally result in a pretty even distribution, as the division of the seed bed into so many cells has a tendency to make the seed scatter. More leaf mould of a somewhat looser texture than the first is now sifted over all, a thorough watering through a rose of the finest gauge is given, and the operation is complete. The boxes will require judicious shading and watering until the seedlings show above ground, by which time the soil will have settled so far as again to expose the top edges of the reeds, thus affording an opportunity of thinning out the superfluous plants so as to leave only one in each of the cells. The thinnings, which will not be numerous if the work has been well done in the first instance, need not be wasted. They can be pricked out into nursery beds for transplanting at a rather more advanced age than the seedlings left in the box. The latter are allowed to remain as long as they show signs of vigorous growth. When the growth begins to flag it is a sign that the roots have penetrated their tubes to the bottom of the box and are ready to take a wider range in search of nourishment—then is the right moment for planting out. This, after the precautions that have been taken, is a very simple process. Dull or showery weather should be chosen, and if there be a likelihood of continuance of such weather the season of year does not greatly signify. It is, however, well to avoid planting out during the months of November, December, and January, on account of the lengthened spells of dry heat to which those months are liable; and, generally, the most favourable time may be reckoned from about the middle of February to the end of June. The amount of preparation required for the ground to be planted will of course vary according to its character. If anything approaching to thorough tillage is needed before the roots can get hold of the soil, it may be inferred that the latter is wholly unsuited for artificial forest. In reasonably mellow soil it will be quite sufficient to cut out a spit the depth and width of the spade, turn it upside down in the hole made, give it a few perpendicular cuts to loosen and disintegrate the staple—and plant. In very favourable situations, where the soil is loose and mellow to a considerable depth, it is hardly necessary to do even this much: the spade is thrust into the ground, and a slight wrench to widen the cut enables the

piece of reed, with the seeding it has nourished, to be slipped in without further ado. Whatever fashion is adopted the plantlet suffers no check provided the weather be favourable, the rootlets forthwith expanding in their native element and assimilating the nourishment it affords. It is, of course, desirable to observe some caution in removing the seedlings to the place where they are intended to remain. The best plan is to wheel or carry the whole box without disturbing its contents until the spot is reached, when the sides should be cautiously wrenched asunder and the reeds taken out one by one, or in faggots of a dozen or more, as convenience may dictate. No more should be pulled asunder than can be conveniently planted the same day, and, with due care to prevent the evaporation of moisture or exposure to sunshine, those that have been allowed to remain intact will take no harm.

At this point it is proper to warn intending planters that no success need be expected if cattle are allowed to have access to the reserved belts or patches. There is no more deadly enemy to jungle timber, even of mature growth, than the constant poaching and consolidating of the ground above the roots by stray cattle. Any patch into which they can manage to force their way for habitual resort is speedily doomed. First, the after-growth disappears; constant nibbling and trampling soon makes havoc of the seedlings that were destined in the course of nature to take the place of the adult and decaying trees, and there is an end to reproduction. Next the undergrowth of bushy shrubs and climbers suffers, that protected the boles and trunks from too rapid atmospheric changes and helped to maintain that perfect calm and equable warmth which is so striking a feature of the virgin scrub. As these disappear their place is taken by the omnivorous lantana and other exotic weeds, and imperceptibly tree after tree dwindles and chokes in their pernicious embrace until not a trace of the original vegetation is left. All timber belts, then, must be rigidly fenced off, not only while young but in all stages of their growth.

Since it is to the interest of all to foster liberal and public-spirited views on the subject of forest conservancy, it is suggested that agricultural associations throughout the Colony might fairly devote a part of the funds at their

disposal to prizes offered for the largest, best kept, and most flourishing plantations of useful shade and timber trees. Under incentives of a like nature several of the Western States of the American Union, once desolate and treeless wastes, have within the last quarter-century become thickly studded with orchards and plantations of timber trees, and as the work of reclamation proceeds, it is satisfactory to note that a sensible improvement of the formerly extreme climate has been observed. Similar desirable results have followed from similar action in the drouthy and sunburnt colony of South Australia, the only part of this continent where forestry has received that enlightened support and encouragement from the State without which the most public-spirited private efforts can be of little avail. Of such results one example must suffice. The District Council of Jamestown, having jurisdiction over an area which for barrenness, heat, parching winds, dust-storms, and general desolation and discomfort was unequalled throughout the colony, began some twenty-five years ago to devote a portion of their revenue to tree-planting. Shade-trees, mostly Tasmanian blue-gum, planes, poplars, and European or American conifers, were planted in lines along the district roads, in clumps about the commonage lands, and in a more systematic and regular manner over a range of bald hills that overlooks the township of Jamestown. When the attempt was first made to establish a forest vegetation in a district where nature herself seemed to have barred the growth of trees, the Council incurred much ridicule and even opposition for persisting in what many of the ratepayers regarded as a wasteful hobby. It was not long, however, before the wisdom of the plan pursued was universally acknowledged. The saplings, contrary to expectation, grew apace, and as their numbers were extended began to form a new and refreshing feature in the once arid landscape. By-and-by it began to be noticed that the roads were less dusty, the hot winds less continuous and more tolerable; that rain-showers, once almost unknown, were becoming common; that extremes of temperature in summer and winter diverged less widely year by year. Watercourses that had never held water for more than an hour or two began to look damp and

green, then to trickle, and finally to flow copiously from one brimming pool to the next. Cultivation, never before attempted, began to extend with fair success, and where only a few years previously the endeavour to establish an orchard would have been merely money thrown away, abundance of fruit of excellent quality is now grown. In a word, a district measuring some sixty square miles in extent has been transformed from a hideous desert into a blooming garden by the simple expedient of planting all waste tracts with shade trees. In all parts of Australia the diffusion of a taste for forestry would soon open a new and valuable resource to the small farmer. In all countries where the people have become alive to the utility of forests and necessity of preserving and extending them planting soon becomes one of the most cherished pursuits of every class, from the big landowner who measures his estates by the hundred thousand acres to the suburban cottar on his half-acre lot. Under such circumstances the demand for seedlings is always far ahead of the supply, and the cultivation of saplings for planting out develops into an important branch of rural industry. It is hardly possible to conceive a more interesting, instructive, and in every respect suitable occupation for the younger branches of a farmer's family than this. Not the least recommendation is its high educational value; for thus, and thus only, can there be instilled into the coming generation, through the medium of personal observation and experience, an intelligent regard for the beauty and utility of those umbrageous woodlands which impart to our Colony nearly all its attractions and no mean proportion of its wealth.

CHAS. H. BARTON.

NOTES ON THE MANGO.

THE Mango (*Mangifera indica*) is a moderate-sized handsome evergreen tree, well known to all who have visited tropical and semi-tropical countries as producing a rich fruit. In such climates it is cultivated wherever the arts of civilization have penetrated, and it may there be said to hold the same status among fruit-trees as the apple holds in other and colder climates. There are few, if any, of the other British colonies which possess the extent of territory, with soil, climate, &c., so admirably fitted for the culture of the mango as Queensland. Along the southern, northern, and north-eastern coast watersheds there are extensive areas (selected and unselected) of gentle undulating lightly-timbered rich virgin forest or good grass lands, the surface soil, consisting of an open dark-brown friable loam of from 20 to 24 inches in depth, resting on an open subsoil, requiring little drainage, and sheitered from the cutting and parching winds, which are in every way suitable for its cultivation.

In virgin soils, after the usual preparation of felling and clearing away the wood, &c., the land is lined or marked off into rows 25 feet distant from each other. If means do not permit of the whole of the ground being trenched at once, it is trenched along the lines about 4 feet in width and 3 feet in depth. The best method of doing this is to dig out the surface soil of the first 4 feet, and cart or wheel it to the point at which the trenching will terminate. The bottom spit should then be stirred or broken up 12 inches or more with a spade or fork. This done, the top spit of the next trench is turned over the newly-worked subsoil, and thus the work is proceeded with till completed. By this course the surface and subsoil will be kept in their respective natural positions.

The months of August, September, and October are the most suitable for planting in Queensland. For this purpose good hardwood stakes are required, from 4 to 5 feet in

length, and from 2 to 3 inches square. These stakes are sharpened at one end and driven into the trenched ground to a depth of 15 inches, at an equal distance from each other of 25 feet. They should be placed alternately, that is, the stakes of the second row should be in the centre of the vacancies of the first row.

For planting choose a calm, cloudy day, and proceed as follows:—Dig a hole round each stake 18 inches square and 12 inches deep, into which place the plant, taking care that the tap-root does not get bent, twisted, or broken. The lateral roots are then spread out carefully, and covered with about 8 inches of the best surface soil. When this is done, give a good soaking of water to settle the soil around the roots, then press the soil gently with the foot all round the stem, fill up the hole and fasten the plant to the stake, in order to prevent it from being blown about. After planting, in order to protect the roots of the plants from the rays of the sun, it is necessary to spread a good covering of straw or coarse grass all round the stems until they are shaded by their own foliage. When once the trees have become thoroughly established remove all superfluous inside growth and cross-branches, so as to admit a free current of air.

During the progressive growth of the mango plants the space between the plants on the trenched ground could be used for the culture of pine-apples, &c., and the unprepared portion between the rows dug or ploughed, and utilized in the cultivation of vegetables or other produce suitable for the nearest market. About the third or fourth year it will be necessary to trench from 2 to 3 feet on either side of the already trenched portion, and this should be continued every two or three years till the whole is trenched.

The number of varieties raised from the seed of the mango is very great, and some of these numerous varieties possess the highest excellence in point of flavour, while others have fruit so extremely fibrous and ill-flavoured that it has been said to resemble nothing more than tow steeped in turpentine, and these, of course, are not used as food.

The varieties—viz., Dohdohl, Strawberry, Alphonse, Gumpohr, Bengale, Sangier, and Gratissima—were imported

into the colony as grafted plants, packed in Wardian cases, from Mauritius, Bombay, Calcutta, Java, and Singapore, during the years 1857, 1861, and 1866, and in the above-mentioned countries are held in higher estimation than any of the numerous varieties they have under cultivation.

These varieties were propagated, chiefly by grafting and inarching, and on two-year old mango stocks, also by layers, and distributed in earthen and bamboo pots to public and private establishments in various parts of Queensland. Those propagated by the first and second methods formed into handsome small-sized trees, and yielded fruit equal to that produced in their native land. Those increased by layers did not produce such good results, the fruit being deficient in quantity, and the trees never attaining the dimensions of those produced by the former mode.

The ripe fruit, the produce of the original imported plants, was freely distributed to residents in Brisbane and elsewhere, but only two good kinds have been raised from the seed which are worthy of a place in the garden or orchard, thus showing those intending to plant that they should not select seedlings, but choose good grafted kinds already proved by experience.

The following is a description of the fruit in the order named:—Mango dohdohl was imported from Mauritius. It bears the largest fruit of all the varieties. The average fruit weighs from 1 lb. to 1½ lb.; in shape it is an irregular oval, somewhat flattened on two sides, and at the top and bottom; colour dark-green, diversified with longitudinal stripes of a brownish hue, and dotted over with minute specks of a yellowish-brown tint. This fruit, although palatable, is fibrous and inferior in point of flavour to that of the Strawberry mango. This splendid variety was imported from Bombay. The fruit averages about 12 ounces in weight, and is of most excellent flavour; in form it resembles a compressed oval with one end slightly curved inwards; the skin is of a rich olive colour, approaching green towards the top, and deeply stained on the exposed side with bright crimson, breaking into spots of a darker colour; flesh of a deep yellow colour, filled with abundant juice, and with little fibre next the stone; flavour sweet, luscious, highly aromatic. The Alphonse was imported

from Calcutta. The description of the two varieties from Java, viz., Gumpohr and Bengale, and of the two from Singapore—viz., Sangier and Gratissima—so nearly answer to this mango that in giving it a definite character space would be vainly used. The difference between these varieties is so immaterial that the one description will embody all. The fruit is more elongated than the strawberry variety, and thereby loses so much of the oval shape as to approach more closely to a cone. This form is, however, broken by the peculiar inward curve at the top, which distinguishes the mango fruit. The skin is of a pale yellow-ochre colour, a little brighter and inclining to orange near the stalk, and covered over (upon minute examination) with paler specks. The flavour does not appear to differ much from previous description; perhaps it is a little more luscious, and a little more fibrous.

The grafted plants produce fruit the third season after planting, and by the fifth or sixth year should yield a sufficiently remunerative return for the culture.

The mango harvest in the northern parts of the colony begins early in December, and lasts till the end of January. In the southern districts, however, it is much later, commencing in January, and continuing till about the end of March.

The fruit intended for local consumption should be left to ripen on the trees, but that for exportation should be gathered on a dry day, when just commencing to change colour, and packed with dried oaten chaff or fine sawdust, in perforated cases, sufficient to hold from six to eight dozen fruits.

The mango, as a rule, is very hardy and vigorous, and possesses a remarkable constitution, which adapts it to far lower latitudes than that of its native land, and in course of time, as the cultivation of this peculiar fruit extends, there is no doubt that it will be as familiar to the colonists as many plants which are indigenous to Queensland.

WALTER HILL.

NOTES ON GOOTEE.

Mangoes are not reliable when grown from seed, and it is useless to try slips or cuttings. The approved methods in India, the home of the mango, is by gootee and inarching. The latter plan, as is generally known, is a somewhat delicate operation, requiring a skilful hand for its successful accomplishment. Gootee, however, is easily performed. A mature branch of suitable size is selected, from which a ring of bark, about an inch, is cleanly removed; a lump of well-worked clay is then closely pressed around it and secured by a piece of coarse cloth or some open material, sewn or tied on it. Above the gootee is suspended a vessel, usually a globular clay pot, having a small hole in the bottom through which a cord, with a knot at one end to retain it in its place, is passed; the other end of the cord is then wound round the gootee and the pot is filled, and continually supplied, with water, which gradually trickles down the cord and keeps the gootee moist. After a few weeks the clay is filled with roots, the branch is then cut off below the gootee and planted. Fruit exactly like that of the parent tree is thus insured.

A *choice* mango being a fruit of the highest excellence is deserving of far greater attention than it has hitherto received, more especially with regard to the selection of good sorts. Most of the mango trees in Queensland, as in India, produce fruit of a very inferior description, which is found difficult to sell even at low rates, whereas really good fruit meets with a ready demand at high prices. It would be much to the advantage of Queensland if every person possessing a bad or indifferent mango tree would uproot it and plant a good tree in its place. The mango readily responds to liberal cultivation and amply repays any extra care bestowed upon it. I have been told of one tree which has this year yielded a thousand fine fruit.

Mango chutnee is a delicious condiment, very highly esteemed. It has hitherto been largely imported, but might easily and profitably be manufactured in Queensland.

D. O'CONNOR.

THE GRAPE-VINE AND ITS CULTIVATION IN QUEENSLAND.

With Rudimentary Notes on Wine-making.

The grape vine (*Vitis vinifera*) is supposed to be a native of the shores of the Caspian Sea, about S. latitude 40 degrees to 45 degrees, and is extensively cultivated in Europe between the latitudes of 30 degrees to 45 degrees S. Experience has already proved that many parts of Southern Queensland, particularly the Mitchell and Roma, on the Maranoa, and the Darling Downs, are well suited for the cultivation of the vine and manufacture of wine.

Besides the *V. vinifera*, which includes all the European varieties, there are other species of vitis, and some of them deserving of more extensive cultivation, notably *V. Labrusca*, of which *Isabella*, *Catawba*, *Delaware*, &c., are familiar examples. The names of the most desirable sorts of these, and also the European varieties, will be found at the end of this paper.

Australian wine has already made a favourable impression in the English and other markets outside of Australia, and much of the wine now made in Queensland only requires age and proper handling to be saleable in any quantity at remunerative prices. There are many vigneron in different parts of Queensland who are prepared to buy the produce of small growers who do not care to make wine, and the demand in the northern districts for good table grapes far exceeds the supply.

In choosing a site for a vineyard the two principal things to be considered are aspect and the nature of the soil.

The best aspect is undoubtedly an eastern one, because the morning sun is favourable to the ripening of fruit and is also inimical to the growth of parasites such as *oidium* and other fungoids. N.E.N. and S.E. are the next best; avoid a western aspect if possible.

The best soils for grapes for winemaking are those containing a large percentage of carbonate of lime, called calcareous soils. Volcanic soils are also very good. On the slopes at the margin of the plains, and also on some of the ridges on the plains, there will be found a depth of from 6 to 18 inches of rich chocolate soil resting on a very porous subsoil of a calcareous nature, a sort of soft rock, in many places honeycombed. This sort of ground when trenched produces heavy crops of grapes and is well adapted for table grapes, but would probably produce only a coarse wine. There are hundreds of acres of stony ridges in many parts of the colony, useless for other purposes, which are admirably suited for the purpose of vineyards if trenched and the largest stones taken out. If the incline be so steep as to necessitate terracing, the largest stones could be used to form walls on the lower side of each terrace; and from experience the writer is of opinion that a better class of wine can be made from grapes grown in such a situation than from those grown in many places where there is a great depth of soil. In such situations the perfect drainage afforded by terracing, and the heat reflected by the stones forming the walls, conduces to a higher development of sugar in the grape than obtains under ordinary conditions.

The rich black soil of many parts of the Darling Downs is altogether unsuitable for grape cultivation; clayey ground should also be avoided. A sandy soil—*i.e.*, a soil containing more than 80 per cent. of sand, though easy to prepare for vines, is not likely to produce other than a weak, thin, harsh wine, requiring a strong dosing of alcohol to make it keep.

The grape vine will, however, adapt itself to, and grow moderately well in, almost any soil or situation, so that everyone should plant a few vines to grow fruit enough for home requirements; but it is chiefly in the interests of those who contemplate growing them largely that this paper is written.

Whatever may be the situation or character of the soil it must be trenched at least 20 inches deep, for bear in mind that the grape vine is impatient of niggardly

treatment in the preparation of the ground before planting, and if not done before planting no after cultivation will entirely remedy this defect, although after-cultivation will materially affect the productiveness and longevity of the vine. And when it is considered that a vineyard once planted in well prepared ground and properly cared for afterwards will continue to produce good crops for 100 years—(J. C. London, F.L.S., F.R.H.S., &c., in his "Encyclopædia of Plants," page 175, says "* * * * a vineyard once planted will last two or three centuries") it will be understood that the preparation of the ground is of the utmost importance. As bearing on this subject, I might instance the fact of several acres of vines being planted in Victoria in accordance with the recommendations of a prize essay on the planting of vineyards. Thirty years ago the then Government of Victoria offered a prize for the best essay, as above; the one that obtained the prize, recommended that the ground should be simply ploughed and the vines planted without further preparation: those who adopted that system found that their vines grew promisingly for the first few years, but when they had attained to an age when they ought to be doing their best the produce began to decrease and the vines began to languish and they became unprofitable; and it was found that one acre of vines planted in well prepared ground was worth six acres planted as recommended in the prize essay.

The operation of trenching is so generally understood that any remarks on the subject may seem superfluous; it may not be so generally known, however, that the vine does the best when the soil at 12 to 18 inches below the surface is richer than that at the surface; therefore in trenching for vines it is better to completely reverse the natural state of the soil, unless the subsoil be a clay, in which case it would be better to leave it at the bottom. But, as before remarked, this kind of soil is unsuitable for vineyard purposes. If, however, there be only a few inches of such subsoil, and that of the nature of a marly clay, this will be better on the top, as the weather acting on it would ærate and pulverise it and quite alter its nature, and such soil would not encourage a growth of weeds such as a better soil would. This latter remark

applies very forcibly to that class of soil mentioned above with the "rotten rock" subsoil. The writer has found that when such soil is reversed the vines grow strongly, weeds are easily kept down, and such soils never crack in times of severe drought, nor wash away during heavy rains.

As the planting of a vineyard is necessarily expensive, an inexperienced person should get the advice of some competent man before venturing upon planting extensively; if, however, there are vineyards in the vicinity of the same kind of soil, it may be sufficient to ascertain what kinds of grapes are the most suitable for that particular locality. The kind of grape that does best in one locality is often found to be altogether unsuitable for another, and that sometimes within a few miles. This applies also to different kinds of soil in the same neighbourhood.

PREPARATION OF CUTTINGS, &c.—The ground should be prepared if possible in summer, and sufficiently long before planting to allow it to settle down after trenching. A supply of cuttings of the sorts desired—*true to name*—should be procured from some vineyard where the vines are known to be clean, healthy, and vigorous, whether in the vicinity or not is of no consequence. The end of July or beginning of August is the best time to take off the cuttings. These must be wood of the previous season's growth with an inch or so of still older wood. The best cuttings are those on which the buds, or joints, are moderately close together, say six buds on a cutting 14 inches long. From 12 to 15 inches is the proper length for a cutting. In making the cutting, cut off the lower end immediately below a joint, making a clean cut without splintering the base. Or, if this is accidentally done, cut off the injured part at the next joint leaving the cutting the proper length and an inch or so of wood above the top bud. When making a large quantity it will be necessary to have a trench ready opened, so that the cuttings can be laid in as a few dozens are made, to prevent the "heel" from drying. Choose a place that is moist—not wet—and cool if possible, to lay the cuttings in. Open the trench about 10 inches deep, lay in a row of cuttings quite thickly, half fill up with soil, then tread the soil very firmly to the base of the cutting and then cover up the cuttings

to within an inch or two of the top bud. Open another trench 9 inches or a foot from the first and parallel to it and lay in more cuttings and tread as before, and so on till all the cuttings are in. If it should be very dry weather the cuttings will require watering occasionally. Water thoroughly, and once a week will then be sufficient. In from four to six weeks, according to circumstances of situation and state of the weather, the top buds of the cuttings will begin to swell and then to burst, indicating that the cuttings have begun to "callous," *i.e.*, to form a sort of warty excrescence at their base; this is preparatory to the sending out of their roots; and it is now the cuttings should be put out into their permanent situation in the vineyard.

PLANTING.—The distance at which the vines are to be planted must be determined by, 1st, the kinds of grapes intended to be grown; 2ndly, by the method of cultivation to be adopted; and 3rdly, whether it is intended to adopt the trellis system of training, or simply to tie to stakes. If it is intended to use horse power and tie to stakes in cultivating (I am alluding now to vineyards for wine-making purposes) I would recommend that the vines should be planted 3 feet 6 inches or 4 feet apart in the row, and 6 feet between the rows, as preferable to the distances generally adopted—*viz.*, 5 feet by 5 feet. If the trellis system of training is intended, 6 feet apart each way will be enough for the European varieties, and for a few of the less robust growers of the Americans 10 feet. For the stronger growing sorts there should be 6 feet between the rows and 8 to 10 feet between the vines in the row. The trellis is the only profitable mode of training these latter whether grown for table or winemaking.

For table grapes of the European sorts 6 feet by 5 feet will be suitable distances. At the first-named distances there would be 2,074 vines to an acre, and at the last-named 1,452. At the larger distance, *i.e.*, 6 x 10, there would of course be just half of the latter number—*viz.*, 726 to an acre.

Uniformity in planting is desirable whatever mode of training or cultivation is intended, and to insure uniformity proceed as follows:—stretch a line the way the rows are to run, and with the corner of a small hoe, or other

suitable implement, draw a drill an inch or two deep ; measure off the distance to the next row, shift the line and mark as before, and so on till several rows are marked. Then stretch the line at right angles to said marks (*i.e.*, across the marks), beginning, of course, at the outside of the plot next to a path or fence, and put in a cutting where the line crosses the drills. Before starting to plant it will be necessary to have ready a bucket half filled with a liquid mud, made by mixing soil of any kind with water to the consistency of thick paint. As the cuttings are taken from the place they have occupied for some weeks, place them in the bucket of "puddle" from which they can be taken one by one as required for planting. Any of the cuttings that have not begun to "callous" should be rejected, in which case there will be very few, if any, vacancies to be filled the following season.

Many persons prefer to put the cuttings in beds to root, and to plant them out the following season. This system has its advantages: in the first place, there is only a small area of ground to be kept clean ; secondly, in case any cuttings should fail to take root it will matter but little, as a greater number can be put in than will be required, thus allowing for failures ; and lastly, it gives an extra year to prepare the ground. This plan has also its drawbacks, as transplanting necessitates the cutting back of all the roots, thereby giving the young plant such a check that it is questionable which has the advantage at two years after planting, the rooted vine or the simple cutting. Those who desire to plant rooted vines, and have the ground ready, can obtain one-year-old rooted vines at any of the nurseries at prices ranging from 7s. 6d. per 100 to £5 per 100. Whether rooted plants or cuttings are to be planted it will not be necessary to dig a large hole in recently trenched ground. Either must be planted so that only one joint or bud of the plant or cutting shall be above ground. Plant nearly perpendicularly ; and whether in the case of rooted plants or cuttings, see that the soil is firm about the roots or lower end of the cutting. Neglect of this precaution will be sure (in the case of cuttings particularly) to result in the failure of a large percentage. An old broom handle or shovel handle cut square at one end and a cross piece put on the other end,

forming a sort of crutch, is a very suitable contrivance for making the holes in planting. Cut a niche all round the handle at a distance from the bottom corresponding with the length of a cutting, and with a little judgment one need never make the hole too deep or too shallow. In planting have the cutting ready in one hand to drop into the hole made with the other, then place the cutting and press the soil to its base with the dibble.

For rooted plants, open the hole with a spade straight down from the line. Nothing more need be done except to keep the ground clean till the following July, which will be the season for pruning. Means for tying the vines, either stakes or trellis, should be supplied at the time of the first pruning.

PRUNING.—At the first pruning of young vines the previous season's growth must be cut away, leaving only one eye or bud. Any shoots coming from below the ground should be cut completely away, as well as all roots from joints within four inches of the surface of the ground. (*See "Surface-rooting"*). At the second season's pruning two buds may generally be left; but even then it requires some judgment to decide whether a vine is likely to produce two strong canes or not, and it is better to err on the safe side. Leaving too many buds in the early stages of the growth of vines has been the means of destroying many plants, or of so impairing their constitution as to keep them in a weak and languishing condition, making them unprofitable.

The object in pruning at this stage should be to induce vigorous growth, and the most ignorant in these matters will understand that a vine will make a more vigorous growth from one bud than from two; so that a vine having made only a weak growth should be cut back to one eye, even at the second pruning.

Previous to this it will, of course, have been decided what mode of training is to be adopted, and at the third pruning this must be taken into consideration. If the trellis system is to be adopted, and the vines have made two strong canes, a length of two feet, more or less, according to the strength of growth of each cane may be left, and the canes should be bent down and fastened horizontally

to the bottom vine of the trellis: upright canes at distances of a foot apart should be trained from these for the fruiting canes.

Subsequent pruning will consist of cutting back to a single eye of the upright canes, the renewal of an exhausted cane by cutting back to one bud from the horizontal cane, extending the latter to its limits, and training other upright canes from the extension. If for tying to stakes, at the third pruning cut each cane back to two buds if strong, and one bud if weakly. The object to be kept in view must be to produce as much fruit annually as is possible without weakening the vine.

SURFACE-ROOTING.—This should be done at pruning time. The following remarks on surface-rooting are taken from a paper I read before the Darling Downs Horticultural Association, August 7th, 1885:—"I have advocated for the past twelve years the cutting away of surface roots of grape vines to the depth of, say, 5 inches, as my experience has convinced me they are in no way beneficial, but on the contrary they tend to jeopardise the crop at any time from soon after vegetation until the crop is gathered, especially if there should be occasional showers, as is usual in this locality in November and December. The surface roots would be readily acted upon by showers that would have no effect on vines devoid of roots near the surface, as they would greedily absorb the moisture, which would cause a greater flow of sap and a more luxuriant growth of the vine, producing favourable conditions for the development and spread of oidium."

It is of the utmost importance that all roots near the surface should be cut away during the first few years of the existence of the plant; because if these roots are allowed to grow, the lower part of the stock will not increase in size at the same rate as it will about and above these roots, and it is no uncommon thing to find in some vineyards where surface rooting has been neglected vines from six to nine or ten years old which near the surface of the ground are from 2 to 3 inches in diameter, yet at 8 inches, and in some cases less, below the ground they are little if any larger than when put in as cuttings. Where these roots are cut away the stock increases in size uniformly down to the bottom, and it needs but the appli-

cation of a little thought to arrive at the conclusion that the latter is a very desirable object to attain if we desire our vines to increase in productiveness as they increase in years.

When the vines begin to vegetate in spring all growth starting from the old wood—*i.e.*, below the lower bud left in pruning—should be rubbed off, and as soon as the shoots are about a foot long the first sulphuring should be done, and even before this if there are any indications of oidium. It is always better to sulphur early as a preventive. (*See* “Sulphuring.”)

The vines will require constant attention at this time of the year; those on trellis will require the upright canes tied in their places, and all buds starting from the horizontal canes, where not wanted, must be rubbed off. Any barren canes which are not in the position to be wanted for next season should be removed.

Some vines will often set more bunches than they can mature without distressing themselves, and all in excess of one bunch to a cane in young vines, unless very vigorous, should be removed. The tying-up of vines grown for tying to stakes should be delayed if possible till after the vines have flowered and set their fruit, though it will often be necessary to tie odd canes earlier than that to prevent their being broken off by the wind. In tying, avoid bunching many leaves up together, and try to arrange the foliage so as to give the greatest amount of light and air to the inside of the vine, and at the same time to shade the bunches of fruit from the direct rays of the sun. Cut off the tops only to prevent their rambling beyond due bounds. Keep the vineyard free from weeds, and dig or plough the land every year after the pruning.

SULPHURING.—This operation is performed to prevent the vines being attacked by a fungoid called *Oidium Tuckerii*, and also to check the spread of the disease when once the vines have become affected. The sulphur used is the ordinary flower of sulphur, which can be procured from any of the grocers or general storekeepers at 3d. per pound, or by the cwt. at about 2½d. per pound. Some growers apply the sulphur by means of an ordinary flour-dredger, but the best and most expeditious method is by means of sulphur bellows, of which there are several makes: the

best, in my opinion, is Barnes' patent, which has a cylindrical tin box to hold the sulphur, and a tin cap perforated at the top, fixed on top of the cylinder, through which the sulphur is driven with some force, which is necessary. These bellows permit of the sulphur being blown up through the vine so as to come in contact with the under side of the leaves, which is very desirable. The sulphur should be well dried and sifted if necessary, because the more finely divided it is the less there will be needed, and it will also be more effectual. Sulphur in fine warm weather when the vines are quite dry. Many vignerons mix lime or fine ashes with the sulphur to make it go farther, but as sulphur and that alone has the power of destroying the mildew, any admixture would only tend to nullify the action of the sulphur. It will be necessary to sulphur a second and often a third time if the weather is moist and warm, conditions which favour the spread of oidium. The most critical time is when the berries are about the size of small peas, just when the vines are the most luxuriant. Another disease to which vines are liable, especially in very wet seasons, is the "black spot." I have had the whole of my crop in one part of a vineyard destroyed by this disease, while in another part the same kind of grape was quite free from it: in the latter case the ground was drained below the surface, and in the other case it was an undrained flat at the foot of a steep slope, the upper part of which was a terrace, on which the grapes were also free from spot. I have tried several things to prevent "black spot." The most effectual remedy for black spot is salt and lime as manure in alternate years, and the keeping down of surface roots together with underground draining. Of that dread pest *Phylloxera vastatrix* I need say nothing, as we are, so far, happily free from it in Queensland.

The following are a few of the best descriptions of vines, as far as they have been proved here. Wine grapes:—"European" (black), "Black Spanish," "Black Cluster" (small bunch and berry), "Pineau," and "Hermitage," in the order named. White (wine)—"European," "White or green Solferino," "Madeira," "Chasselas," "Verdeilho," "White Sherry," and "Duchess of Buccleugh," in order named. "Tokay" and "White Malvaïson" are splendid wine grapes, but do not bear well on all rich soils.

TABLE GRAPES.—“Black Hamburg” is the black grape *par excellence*, and does well almost anywhere. The Frontienans, both red and black, are also very desirable sorts, but very much subject to oidium. The same applies to the several Muscat grapes, all of which are splendid table grapes. The “White Syrian” does not do well in the rich deep soil, but for either of the soils named under the head of “soils” except volcanic it has proved a good and profitable grape. “Royal Ascot,” “Dutch Hambro,” “Golden Hamburg,” “Chasselas,” and “Foster’s Seedling,” of the European varieties, are desirable sorts to plant. Of the American sorts, I can recommend the following—“Gœthe” (a most excellent table grape), “Aidriondac,” “Wilder,” “Delaware,” “Rebecca,” “Diana,” “Iona,” and “Maxatawny,” as those with less of the foxy taste than others, such as “Catawba,” “Isabella,” &c.: these two latter are good bearers, and especially the lastnamed, and both of them make a good wine.

Farther south from Toowoomba—twenty to thirty miles—in soils similar to those recommended, the writer has found the “White Syrian,” “Tokay,” and “White Malvaison” to do well and bear abundantly; also “Black Morocco” and “Black Prince,” neither of which seem to do well in many parts of Toowoomba and its vicinity; although those sorts recommended for that district do equally well farther south. Very full lists of names of grapes both table and wine will be found in any of the nurserymen’s catalogues so that those who desire to try the qualities of sorts not named herein can do so. My advice is to plant known and tried sorts largely, and experiment with other sorts out of the profits. Also to plant the several sorts by themselves, leaving space to extend the area of any one sort if desired, without having the different sorts mixed together, except in the case of table grapes, which is not of so much importance.

WINE MAKING.—It will be impossible to give this subject justice in the space at my disposal, therefore the information given will be merely rudimental. Before commencing to make wine it is essential that one should know something of the conditions necessary to transform the juice of the grape into wine. The juice of grapes is not wine but it is converted into wine by fermentation—*i.e.*,

alcoholic fermentation; but if the fermentation is kept up too long the organic character changes to acetous fermentation, and the wine is spoilt and will only make vinegar. Ferments are living organisms which in growing assimilate a portion of the saccharine matter, converting it into carbonic acid gas, which escapes into the air, and into alcohol and other substances which remain in a fluid state in the wine. Alcoholic fermentation begins the phenomena essential to the transforming the juice into wine. The conditions essential to the process are—1, Juice containing sugar in solution; 2, exposure of juice to the air; 3, some kind of ferment, or certain nitrogenous substances (always present in juice of ripe grapes); and 4, a moderately warm atmosphere. The juice of ripe grapes contains from 14 to 25 per cent. of sugar; and in the case of very ripe grapes in a dry and hot year, as much as 30 per cent. Sugar is the essential part of the “must,” and upon the quantity of sugar in the “must” depends the alcoholic strength of the wine. But there are other substances contained, not in the juice alone, but in the seeds, skins, and stalks, which contribute to the production of certain good qualities in the wine as the result of fermentation. The seeds contribute the tannin, indispensable to the keeping of wine, especially red wines; the stalks contain tannic acid, which in excess would be injurious to the wine.

PLANT AND UTENSILS.—The ordinary plant for wine-making on a small scale consist of a press, tubs (and one perforated at the bottom, in which the grapes are crushed by treading or other process; this is generally placed over another tub which receives the juice as it is expressed by crushing); vats open at one end, and a hole near the bottom in which is fitted a tap. Over the hole on the inside there should be a straw bottle-envelope tacked, so as to prevent the seeds and skins coming through when running off the liquor. All utensils should be of wood and kept constantly clean, and when put by for a day or more in damp weather should have a sulphur match burnt in them and be washed again before using. I need not describe the press, as the reader will have opportunities of seeing one or more before he is ready to start wine making. Buckets, dippers, and funnels should all be of wood if possible. The casks to receive the wine, if new,

should be filled with clean water for two or three weeks before wanted for the wine. If second-hand casks they should be spirit casks, and should have contained spirit recently: new casks are preferable. It would be dangerous to apply a sulphur match to fresh spirit casks, but all casks having contained water, or even wine, should have sulphur burnt in them previous to being used for wine, also after being washed at any subsequent period.

THE VINTAGE.—The grapes should not be gathered for wine till they are fully ripe, and having attained the maximum of sweetness there is nothing to be gained by leaving them on the vines, more especially if the weather is unsettled. Pick the grapes in dry weather; carefully remove all green and rotten berries. Have the vats placed on a stand, high enough to place a tub beneath the tap, and see that the press, tubs, and all utensils are scrupulously clean, and well coopered to prevent leaking. When crushing, if the stalks are very green they must be all picked out; place these in a tub or barrel till enough has accumulated to fill the press, then press all liquor out of them and add it to the rest, and throw away stalks: the skins and juice are to be put into the vats together. The vats must not be filled more than two-thirds full, to leave room for the skins to come to the top (which they will do as it begins to ferment) without running over top of vat. For white wine, 18 to 24 hours will be long enough to allow it to remain thus, but for red wine it will require 48 or more hours, according to the temperature of the atmosphere and other conditions not easily explained here. During the process of crushing and putting it into the vats the air mingles with the juice to an extent sufficient for all the changes the wine is to undergo through its influence; though there are instances of the must—*i.e.*, the sweet juice of the grapes, which as before explained is not wine—being exposed to the air in open tubs made shallow so as to expose as large a surface as possible to the air; but this process is adopted only where it is required to make a sweet wine, which will want fortifying to make it keep. In the case of red wine, which, it is scarcely necessary to say, is made from black grapes, the whole of the skins and juice should be well stirred together when the vat is sufficiently full, and in any case a blanket or bags should be placed

over the top of the vats, and kept there as long as it is in the vats. When ready, the wine is run off and put into casks, which should not be filled quite full; the skins are placed in the press, and subjected to as great a pressure as can be given them; the wine that is pressed out should be mixed with the rest, and in the case of more than one cask being filled, each cask should get its share of the pressed wine, which invariably contains some properties to a greater degree than that that was simply run off by the tap. The wine will now be in a state of active ferment, in which state it will continue for a week or ten days, during which time it will rid itself of many of its impurities, throwing these off by the bung-hole, which should be encouraged by keeping the casks sufficiently full. After the abovenamed period the fermentation will gradually subside, till by placing the ear close to the bung-hole no more hissing will be heard, when the bung should be put in tightly and only removed once a week just long enough to fill up the casks. I omitted to mention above, that after the active fermentation is over, the bungs should be put in loosely, but not so that by swelling they will become firm and tight, or the accumulation of carbonic acid gas will cause a vent somewhere. During fine clear weather about two months after the vintage it will be necessary to rack off the wine from the lees into clean casks, run off as clear as possible, and any at the last of each cask which is not quite clear should be put together into a separate cask or keg, which after being fined will do for filling up the casks as they require it, which they will do every 2 or 3 weeks. After racking off, the wine should be fined (*see* "Fining"), which process will take from 1 to 4 weeks according to the kind of finings used, after which it must be again racked off.

FINING.—This is accomplished by means of filtration, differing from the filtration of water in that water has to go through a filter but the filter goes through the wine. White wines are fined by isinglass, or gelatine, and red wine by the white of eggs. A drachm of isinglass, or a half-ounce of gelatine, or the whites of 3 eggs, will be found a fair proportion for a quarter-cask (28 or 30 gallons) of wine, less or more according to the clearness or turbidity of the wine. Isinglass is prepared by kneading it up with a little water till dissolved, then mixing with a small quantit

of wine, say a quart for a quarter-cask, which is then poured into the cask and stirred into the wine. Gelatine is soaked till soft in cold water, then allowed to simmer over the fire in an enamelled stewpan for a little while, mixed with wine, and used as above. The whites of eggs should be well beaten up with a little water, to which is added a little salt, and mixed with a few quarts of wine, and used in the same way.

G. SEARLE,
Toowoomba.

RAISINS, ETC.

Grapes may be turned to other account than table use and wine-making. They may be turned into raisins and currants, for which there is a large local demand. In 1885 the currants imported into Queensland were valued at £12,000, and the raisins at £6,000; and in 1886, at £10,600 and £6,500 respectively; these might be made in the dry heat of the Western districts, and, in addition to supplying the local market, a valuable export trade might be established. In South Australia a very good business is done in dried fruits which are prepared in the colony, and there is no reason why settlers in Queensland should not do as the settlers in South Australia do. Even in the matter of fresh grapes a large export trade could be done, as is proved by the fact that fresh grapes which were sent from Sydney to the Colonial and Indian Exhibition arrived in good order, and were highly commended at the Royal Horticultural Society's Show, at which they were also exhibited. We refer to this matter particularly, because it has been demonstrated by ample evidence that the culture of the vine gives splendid results at Roma and Mitchell in Queensland; and as there is an unlimited area of similar country available for selection in the Western districts, where the same climatic conditions prevail, it is evident that vineyards may be extended very largely.—*Brisbane Courier*, 1st March, 1888.

SUGAR-CANE.

SUGAR-CANE first came into general cultivation as a farmer's crop in Queensland about twenty years ago. Until that time maize and potatoes had been the main crops cultivated, but the production had so far overrun the consumption that the prices obtainable left little margin for profit. Cane had been grown for several years, but the manufacture of sugar from it had not until then been successful, but this difficulty having been overcome, and the profits of the cultivation and manufacture of sugar appearing very great, a very large quantity of the land hitherto cropped with maize and potatoes was planted with cane. Difficulties connected with manufacture soon developed. Small mills were tried with but indifferent success, and ultimately where cane continued to be cultivated it was sold to mill-owners or crushed by them upon terms. Crushing upon terms was soon abandoned. The suspicions of unfair dealing, naturally arising out of the different results obtained from canes appearing to the growers to be equal in quality, making the system unsatisfactory both to grower and mill-owner, and the practice since has been to purchase the cane at so much per ton, according to the density of the liquor contained in them. In some portions of the Maryborough and Bundaberg districts the liquor is purchased by Yengarie and Millaquin refineries at per 2,240 gallons,* and is pumped through pipes from the grower's plantation, where it is crushed, direct to the refinery. The density is ascertained by an instrument called a saccharometer, which is placed in the juice of the cane, and by rising higher out of the liquor, according as the density is greater, shows on a scale the degree of density of the juice; 9° to $10\frac{1}{2}^{\circ}$ Beaumé is a very good density where there is a good flow of liquor. If this density

* The price paid last year was, we understand, £12 per 2,240 gallons. This is lower than any preceding year, but as each ton of cane should yield 120 to 125 gallons of liquor the price is very remunerative to the grower.

is exceeded it is usually attended with a less amount of liquor in the cane.

The development of large plantations in the more northern portion of the colony, where the conditions of cultivation and manufacture are much more favourable than in the southern districts, have nearly crushed out cane cultivation in the latter.

The writer would not advise the cultivation of sugar-cane unless within reasonable distance of some mill the owners of which are prepared to purchase. The assistance given by the Government in the establishment of central mills it is hoped will solve the difficulty experienced by farmers ready and willing to cultivate sugar-cane, but unable to do so for want of capital to erect the necessary machinery, and help also towards putting the sugar industry upon a better footing by separating the cultivation of the cane from its manufacture into sugar. There is a growing disposition on the part of mill-owners to purchase cane grown by farmers, as it enables them to keep their machinery more constantly employed.

The cultivation of cane is very simple. The land, if virgin ground, should be lightly ploughed, to get rid as much as possible of the grass, not so much from any fear of the grass again growing and becoming troublesome (unless it be couch) as to avoid the hindrance to cultivation, should the weather be at all moist, which will be occasioned by the grass clinging round the cultivator tines and making efficient work impossible. The ground should then be well ploughed nine or ten inches deep, and sufficiently worked with harrow and roller to ensure sufficient soft mould for the plant.

It is not always a gain to have the ground as finely harrowed as if small seeds were to be sown, as this will give a favourable opportunity to the germination and growth of weeds, which would not be near so troublesome if the ground were rougher, and such clods as would remain would readily melt down after the first rains. The ground should then be opened up in drills as deep as the plough can go, returning in the same furrow, the drills being from 5 feet 6 inches to 6 feet 6 inches apart, according to the strength of the soil.

There have been a large number of varieties of cane introduced at various times into the colony, but out of the whole number there are but six or eight which have retained any position in the estimation of cultivators, the others having been discarded for various reasons as follows:—

Many varieties of soft luscious cane proved very susceptible to a disease which devastated the plantations some years ago, and have not since been cultivated.

Others did very well as plant cane but did not ratoon well.* And others, including all the old ribbon varieties, were less subject to disease, but were slow growing and very troublesome to clear of the dead leaves in preparing for the mill. Those varieties which are now in most favour are long-jointed canes, the leaves from which as they die are readily detached from the canes, and, while not so large in bulk as some of the discarded varieties, give greater length for the season's growth. Varieties of cane change very considerably under different conditions of soil and climate, so that canes held in great estimation in some districts are rejected in others. Probably experience has proved the canes grown in each district to be more suitable to the peculiar climate; and testimony of this character is not lightly to be passed over.

The plants may be either tops—*i.e.*, the portion of cane cut off when the crop is harvested—or cut from the body of the cane. If tops are used care should be taken that none have been frosted, and, before planting, the leaves should be stripped from two or three buds, so that they may come into immediate contact with the soil.

If plant canes are used the cane should be cut into lengths of three buds each, care being taken that the buds are good. The plants, whether body cane or tops, should be very gently handled, as if the bud is broken off no fresh one will spring, and, though the plant may throw out roots, it will be all in vain. The plants should then be placed in the drills at a distance of about 3 feet from centre to centre. If uniformity of distance be desired the plants should be always planted with the buds pointing one way, otherwise the buds coming out of ground at an angle will

* The canes of the first cutting are called plant canes; those which spring from the stools after the crop is cut "ratoons"—these again being distinguished as first or second ratoons, according to the time of cutting after the plant crop.

point to each other in one case and away from each other in the next, giving a great variation when the plants are growing. Scrub land recently cleared can readily be planted with cane by making holes with the hoe and planting the cane in them.

Cover only very lightly with soil. The best way is to gently push the plant under the loose soil in the bottom of the drill, taking care that the soil is in contact with every part. One inch to $1\frac{1}{2}$ inch is quite sufficient on the top of the plant, and it will grow more rapidly than if planted deeper. After a few days, if the weather be warm and moist, rootlets will be found springing from the joint surrounding the bud, and in from ten to twenty-one days the buds will appear above ground. All the cultivation afterwards required will be to keep the ground open and clear of weeds as long as the horse-hoe can be got through, after which it may safely be left until crushing season. This varies in different districts of the colony, as does also the period of planting, but in most the periods are coincident, so that tops for planting may generally be cheaply obtained from fields cut in the district.

Cutting is done in several ways,* according to the opinion of the grower. Some cut with a knife, the cane being trimmed and topped while in the hand, while others cut with a sharp hoe, and the trimming and topping are done by others with knives following after. When the cane is light upon the ground or stands erect the former mode seems most economical, but where it is very heavy the latter is better. In either case care should be taken to cut the cane close to the ground, as the ratoon will spring from the highest bud on the cane root left, and if this is not below the surface the ratoon will not have the support it would otherwise get, and will be apt to break down under a high wind.

Cane will remain several years in the ground yielding crops every year without re-planting. It must, however, be carefully worked between the rows after cutting, and the ground thoroughly loosened. Ratoon crops are not, as a rule, so heavy as plant cane. The weight of crop varies very much, as much as seventy or eighty tons having been taken from some rich scrub lands in the North. A very

fair crop for an average is from twenty to thirty tons, according to quality of soil. Under the system and with the machinery used in the early days of sugar cultivation it required from twenty-five to thirty tons of cane for a ton of sugar; with the improved machinery and greater skill now employed one ton of sugar is sometimes made from little more than ten tons of cane.

MANUFACTURE OF CANE INTO SUGAR.

The rationale of the manufacture of sugar is as follows:—

The juice is obtained from the cane by crushing, and after being cleared from albuminous and fibrous matter by a process called clarification is concentrated by boiling to a point at which the syrup crystallizes into sugar. The crystallized syrup is then placed in centrifugals, which, being driven at great speed, drive out the molasses and leave the sugar fit for bagging for market. The process itself is simple, but the appliances requisite to get the best results are by no means so simple as would appear at first sight.

In the early days of the industry the liquor was concentrated in a pan or series of pans called a battery kept boiling by a large fire or fires and the steam from which escaped into the air. Under these conditions a temperature of 240° Fah. was required ere the liquor reached the point of crystallization. This great heat destroyed much sugar besides deteriorating the quality of the sugar made, and various plans were adopted with a view of concentrating the juice without subjecting it to the great heat required in the open battery. Wetzell and Baur pans—the principle of each being copper pipes or discs heated by steam and constantly revolving in the liquor to be finished, the pipes or discs carrying with them a thin film of liquor each revolution, evaporation from which was very rapid from the heat of the pipes or discs, while the bulk of the liquor in which the reels revolved was kept under 190°—were used with good effect in all the mills; but the adoption of the vacuum pan—under which the well-known law, that fluids boil at much lower tempera-

ture when the pressure of the atmosphere is reduced than under ordinary pressure, is made use of to enable concentration to be made at lower temperature than could otherwise be possible—is now general. In the vacuum pan there is to be seen as violent ebullition at from 140° to 150° temperature as would be seen in the tache with the same density liquor at 240° . The saving by the use of the vacuum pan from the old process under similar conditions of skill would probably be about one-third more sugar, and what is made worth about £5 per ton extra value.

The economical appliances and processes in the most recent mills are:—

Double Crushing.—The most powerful crushing fails to get out the whole of the liquor by one operation in consequence of re-absorption after passing the rollers, and of the cohesiveness of the liquor; if the cane be of high density the amount of sugar left in the cane would be very great, to obviate this the megass is moistened with water after passing the first crushing, and as the water dissolves the juice left and permits the liquor to come away more readily under the second crushing the sugar saved from passing away in the megass is very considerable.

The cost of mill-power, with all modern appliances, ranges between £300 and £400 per ton of capacity of weekly output.

GEO. GRIMES.

By Authority: JAMES C. BEAL, Government Printer, Brisbane.



